U. S. DEPARTMENT OF ENERGY
Los Alamos Area Office

Safety Basis Review Procedure

REVISION: 3

APPROVED FOR USE:

Los Alamos Area Office
Senior Authorization Basis Manager

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REVISION LOG

Revision No.	*Affected Pages*	*Date*	*Reason*
0	All	November 15, 1999	Publish Procedure @ LAAO
1	Added Appendix D	November 29, 1999	Strengthen Document to include robust Review Guidance not previously present
2	All	August 1, 2000	Rewrite to add review criteria, review processes, roles & responsibilities. Remove AL-specific wording. Modify LAAO procedure to incorporate lessons learned based upon McClure Report, previously noted issues in reviews and to specifically add lessons learned tracking mechanism. Address open EH assessment requirements written against Operations Office in 1996 before LAAO had any formal approval authorities for USQs or other Authorization Basis Documents

3	Lessons Learned Section SABM Responsibilities/ Accountabilities Section 3.2 Review Team Leader Responsibilities/ Accountabilities Section 3.3 Added Memo from LANL AB Office stating LANL AB policy is to use interim SAR review plan	January 17, 2001	Added lessons learned from ongoing and past SAR, USQD, HA, etc. reviews Added SABM numbers 3.2.19, 3.2.20. This will help with the LAAO ISM Review in the March 2001 Timeframe Added Review Team Leader numbers 3.3.16, 3.3.17. This will help with the LAAO ISM Review in the March 2001 Timeframe Added before Appendix E

Summary

This procedure describes the mechanisms for providing review, approval, and maintenance of safety basis documentation at the Los Alamos Area Office (LAAO) for Los Alamos National Laboratory (LANL) facilities and operations. The intent of this procedure is to ensure technical reviews conducted by or for the LAAO Senior Authorization Basis Manager include the appropriate level of rigor and consistency with respect to the application of requirements, including format and content of review documentation. The authorization basis is documented in safety analysis reports, technical requirements documents, Justification for Continued Operations (JCOs) and Unreviewed Safety Question Determinations (USQDs). Safety analysis reports may include Safety Analysis Reports (SARs), Basis for Interim Operations (BIO) documents, Safety Assessment Documents (SADs), and Safety Assessments (SAs). Technical requirement documents may include Technical Safety Requirements (TSRs), Technical Specifications (TSs), and Operational Safety Requirements (OSRs).

Safety basis documents will be reviewed in a systematic manner, integrated with LANL's processes for document preparation and approval. The fundamental goal is safe operation of the facility. This procedure supports that goal by ensuring that LAAO's review of safety basis documents are value-added as opposed to a bureaucratic hurdle or rubber stamp. That is, review team comments and interactions will focus on adequacy of the safety basis and ensuring the safety basis document accurately and adequately develops and depicts that safety basis. This process will be completed with the minimum impact on facility schedules and resources.

1. **Purpose**

The purpose of the LAAO Safety Basis Review Procedure is to ensure a consistent, systematic, technically adequate, and integrated (with LANL) review and approval of safety basis documents prepared for LANL facilities and operations. This review procedure documents the purpose, scope, roles & responsibilities, review process, personnel qualifications, and review criteria for LAAO review and approval of LANL safety basis documents. Appendix A identifies qualified review team leaders and members. Appendix B provides a generic schedule that can be used to develop a review-specific procedure. Appendix C provides definitions of commonly encountered terms. Appendix D supplies a formal tracking mechanism for AB process lessons learned. Appendix E provides the Generic LANL AB review Plan which is required guidance for all DOE reviews of AB documentation at LANL. The purpose of including the LANL Generic Review Procedure is to ensure integration and common understanding of expectations for AB reviews that are accepted by the Department and promotes efficient and defensible production of AB documentation. The overall objective of LAAO review and approval of safety basis documents is to approve an adequate and documented safety basis for facilities at LANL.

This procedure is based on the principles for SAR reviews that are discussed in DOE-STD-1104 (Reference 7.1).

2. **Scope**

This procedure applies to DOE and support contractor personnel who provide review and technical approval recommendations for safety basis documents for DOE facilities and operations at LANL. This procedure also applies to the DOE oversight of LANL facility

authorization bases. The approval authority for safety basis documents for all existing LANL facilities has been formally delegated to the LAAO Senior Authorization Basis Manager. For complete details on delegated authorities, roles, and responsibilities all personnel are responsible for reviewing the current AL FRAM.

3. **Roles and Responsibilities**

3.1 LAAO Area Manager

3.1.1 Holds line management responsibility and accountability for ensuring adequacy of LANL facility safety bases.
3.1.2 Approves safety basis documents for which approval authority is withdrawn from the LAAO SABM.
3.1.3 Delegates in writing as appropriate authorities for AB documentation.

3.2 LAAO Senior Authorization Basis Manager (SABM)

3.2.1 Maintains ongoing contacts with LANL facility and ES&H organizations to obtain early notice of safety basis document development efforts.
3.2.2 Identifies, assesses, and approves resources and plans support for safety basis document reviews.
3.2.3 Appoints safety basis document review team leaders
3.2.4 Approves Safety Basis documents based upon recommendations of review team leaders
3.2.5 Provides direction to LANL safety basis document development projects.
3.2.6 Approves qualifications of team leaders and reviewers
3.2.7 Ensures review team members understand and follow this procedure.
3.2.8 Provides safety analysis review direction to review team leaders and review team members consistent with DOE and LAAO policy
3.2.9 Approves safety basis review plans when necessary.
3.2.10 Determines need for facility-specific safety basis document review plans
3.2.11 Obtains support from subject matter experts from within and outside LAAO to assist in the review of AB documentation reviews
3.2.12 Provides AB documentation review guidance, procedures and direction to the Safety Basis Review Team Leaders as necessary.
3.2.13 Provides for on-the-job training for safety analysts in the process of qualifying to the LAAO SABT Qualification Card.
3.2.14 Ensures interface with the program office in AL and HQ as appropriate so that when an AB document is signed there is coordination on any new potential funding requirements that are placed into the AB as conditions of approval or upgrades.
3.2.15 Issues SABT operations plan with SABT goals and to promote timely reviews and approvals.
3.2.16 Negotiates with LANL on the DOE/LANL prioritized list to ensure that it includes program priorities, ESH weighting for worker and the public, timeliness considerations, cost weighting, and Division priorities.
3.2.17 Ensures that current AL FRAM is referenced when needed.
3.2.18 Per delegation memo from Area manager, SABM is responsible for all Authorization Basis issues at LANL including LIR and Work smart Standards reviews as they apply to

authorization basis (currently the nuclear, nonnuclear, and categorization LIRs).

3.2.19 The SABM is accountable for the proper coordination with the legal Branch on issues when appropriate. This includes for example contract interpretations, FOIA requests, contract issues, unallowable costs, ethics issues, issues involving the Code of Federal regulations, Price Anderson Issues, or other issues that legal needs to be informed about.

3.2.20 The SABM is accountable for the proper coordination of signed safety analyses, approved USQs, Hazard Analyses and other safety documentation with FOB for the purpose of handing off Readiness Verification activities such as ORRs/RAs to FOB.

3.3 Review Team Leader

3.3.1 Provides DOE oversight of assigned safety basis document development effort. Ensures planning is realistic so that DOE review activities and resources can be dependably scheduled. Recommends necessary contractor direction to LAAO SABM.

3.3.2 Maintains familiarity with all references in Section 7.

3.3.3 Selects and makes arrangements for review team members

3.3.4 Manages DOE review of assigned safety basis document as a project, and coordinates with LANL development and review managers to ensure the development, review, and approval efforts are coordinated and managed like an integrated project.

3.3.5 Coordinate and attend review effort kickoff meeting, interim progress reviews, comment consolidation, and comment resolution meetings.

3.3.6 Provides interface to LANL safety basis document development and review leaders.

3.3.7 Consolidates comments from review team members, validates essential comments, and provides comment package to LANL

3.3.8 Provide safety basis document approval recommendation to LAAO SABM

3.3.9 Prepares DOE Safety Evaluation Report for assigned safety basis document (if one is to be prepared).

3.3.10 Captures lessons learned from safety basis document reviews.

3.3.11 The Review team leader is responsible for verifying during the AB review that the most current and applicable Orders, Standards, and other regulatory guidance are being used per required DOE guidance/applicable LANL contract requirements. Note: If the DOE approved contract excludes any DOE guidance, the contract requirements form the superceeding requirements applicable to the review.

3.3.12 Works to the SABT operations plan with SABT goals and to promote timely reviews and approvals.

3.3.13 Works to the DOE/LANL prioritized list to ensure that it includes program priorities, ESH weighting for worker and the public, timeliness considerations, cost weighting, and Division priorities.

3.3.14 Is responsible to the SABM for ensuring that there is adequate interface with the program office in AL and HQ as appropriate so that when an AB document is signed there is coordination on any new potential funding requirements that are placed into the AB as conditions of approval or upgrades.

3.3.15 Ensure that when required for guidance that the current AL FRAM is used/referenced.

3.3.16 The Review team leader is accountable to the SABM for coordinating with the legal Branch on issues when appropriate. This includes for example contract interpretations, FOIA requests, contract issues, unallowable costs, ethics issues, issues involving the Code of Federal regulations, Price Anderson Issues, or other issues that legal needs to

be informed about.

3.3.17 The Review Team Leader is accountable to the SABM for the proper coordination of signed safety analyses, approved USQs, Hazard Analyses and other safety documentation with FOB for the purpose of handing off Readiness Verification activities such as ORRs/RAs. The Review Team Leader is responsible for ensuring that the following words are used in safety analysis approval memoranda: **"Before the operation is authorized, verification of controls implementation is required by FOB. FOB will determine the level of the review required"**

3.4 Review Team

3.4.1 Attend review team kickoff meeting, including facility walk-downs and familiarization tours.
3.4.2 Read all references in Section 7 for background and guidance.
3.4.3 Support interim progress reviews as directed by review team leader.
3.4.4 Attend comment consolidation and resolution meetings as directed by the review team leader.
3.4.5 Interface with, but not provide direction to, safety basis document chapter leads to clarify material and resolve questions before providing comments.
3.4.6 Interface with other review team members to verify appropriate linkages between safety basis document chapters.
3.4.7 Develop and provide comments to the review team leader according to the specified format and by the due date(s) specified.
3.4.8 Assist in preparing Safety Evaluation Report as requested by review team leader
3.4.9 Defend essential comments to the review team leader, as necessary.
3.4.10 Interface with, but not provide direction to, safety basis document preparers to bring submitted comments to resolution.
3.4.11 Bring significant issues and unresolved comments to the timely attention of the review team leader
3.4.12 Review revised document for adequate incorporation of comment resolutions

4. **Processes**

4.1 Review Planning and Team Formation Process

The LAAO SABM will coordinate, plan, review, and manage the flow of AB documents with the LANL Office of Authorization Basis. This includes schedules, milestones, resources, and prioritization in accordance with the annual fiscal LANL AB performance measures. When an AB document is delivered to LAAO from LANL, the LAAO SABM establishes the review task and appoints a review team leader. Based on information from counterparts at LANL, the review team leader is responsible for scheduling reviews as well as establishing the necessary team composition. The manner in which reviews are scheduled and tracked is up to the review team leader. The review team leader can then identify qualified team members to compose the team and obtain commitments that they will be available to support the schedule. Review team leaders and members may be drawn from LAAO, DP-45, Albuquerque Operations Office, the Core Technical Group, or support contractors. Appendix A identifies qualified reviewers and their capabilities. The team leader will ensure adequate coverage of all technical areas.

Review team members should meet or achieve the following general qualifications. More detailed qualification requirements may be specified in Technical Qualification Standards.

- Knowledge of the general purpose, function, organization and content of SARs and TSRs as specified by DOE Orders 5480.22, 5480.23, DOE-STD-3009, and DOE-STD-1027 (References 7.3, 7.5, 7.6, and 7.7)

- Familiarity with the DOE Orders, LANL contract requirements and standards and the Laboratory's Work Smart Standards applicable to the assigned functional area

- Familiarity with the LANL Review Process (Reference 7.2 and Appendix E)

- General knowledge of hazard analysis/accident analysis, such as that covered by the DOE-STD-3009 (Reference 7.3) training course or equivalent

- Previous technical experience and on-the-job training in the preparation or review of safety documents

The team leader should have extensive experience involving safety analyses for DOE facilities. The team leader should have demonstrated leadership ability and strong oral and written communication skills. The LAAO Team Leader must be qualified per the LAAO Safety Analyst qualifications card. In the interim, the SABM may have Team Leaders for the purpose of on-the-job training but all major decisions will be made by the SABM until LAAO Team Leaders are fully qualified to lead reviews.

Team composition can be as small as one for a USQ approval, nonnuclear facility HA, Category 3 Nuclear Facility, or scoped modification to a Category II Nuclear Facility AB approval to as many as 15 or more for full review of a Safety Analysis Report with an accompanying Technical Safety Requirements document for a complex Category II nuclear facility. For these larger teams, topical leads may be assigned as necessary that are responsible for the work of several reviewers. For example, a Chapter 3 lead may compile and consolidate the comments of all reviewers of Chapter 3 material.

The review team leader should be cognizant of the overall schedule and prioritization (using the LANL/DOE prioritized list) of AB documents negotiated by the LAAO SABM and the LANL Office of AB. From this, the team leader is empowered to work within the framework for the adequate review and approval of the assigned AB. The team leader is encouraged to work with LANL counterparts to plan the review and develop a schedule that supports the LANL Office of AB needs while still ensuring adequate time for the review team to fulfill its functions. The actual method that the Review team Lead uses to schedule, plan, and track AB actions is under the Review Team Leads authority. An extensive review plan will not be prepared unless the LAAO SABM and the Review Team Leader determine one is necessary. The review schedule is intended to be posted (LANL/DOE Prioritized list, LANL contract Performance Measure, White Board, LAAO web page, or other means may be used) in advance of receipt of the document for review to enable monitoring of review progress and resource planning by the LAAO SABM.

4.2 In-Process Reviews

The review team leader will either determine the need for and schedule in-process reviews or coordinate with scheduled LANL in-process reviews. These reviews will take place at approximately the 30-70-90 percent intervals of document completion. In some cases, the formal review (see section 4.3) will be conducted at 90% completion. The review team leader will determine the extent of team participation in in-process reviews including meetings, walk-downs and tours.

In-process reviews provide LANL with high level comments regarding the adequacy of the analysis and are designed to supply a coaching and mentoring opportunity at various stages of completion so that there is reasonable confidence in promoting a once-through process for AB approvals with a minimum of defects and no “do-loops” involving whole AB documents. The intent of interim reviews is to identify systemic issues and glaring deficiencies in the analysis or methodology used in the analysis and provide guidance on how LANL may meet the requirements of the DOE Approval Authority. The following table provides typical guiding expectations for in-process reviews of SAR/TSR packages.

	30% Review	70% Review	90% Review
Expectations & Goals	• Facility description including facility processes and major activities defined • LANL Peer Review of 30% Complete and available for 30% meeting and Office Of Authorization Basis formal transmittal has occured for 30% document • Hazard analysis is complete • Hazard analysis and accident analysis methodologies • Hazard identification, characterization, and evaluation • Risk ranking of postulated accident scenarios • Identification of candidate safety SSCs (SC and SS) • Identification of candidate accidents to be analyzed	• All content in 30% review package updated and with comments incorporated • Comment resolution for the 30% review complete P LANL Peer Review of 70% Complete and avaiable for 70% meeting and Office Of Authorization Basis formal transmittal has occured for 70% document • Accident analysis complete • Safety functions and safety system descriptions per DOE-STD-3009-94, Ch. 4 for safety SSCs • Refined performance requirements identified through safety system evaluations • Criticality safety evaluations and controls identified • Preliminary set of TSRs (LCOs) and operational considerations for maintaining safety SSCs • Emergency management program described • Radiation and hazardous material protection programs described	• Finalization of: • Accident analysis safety functions, safety system descriptions, functional and performance requirements, and system evaluations • Derivation of technical safety requirements TSRs complete • Institutional programmatic controls • LANL Peer Review of 90% Complete and available for 90% meeting and Office Of Authorization Basis formal transmittal has occured for 90% document • Comment resolution for the 70% review complete
Considerations	• Arrange facility presentations and conduct facility walkthroughs	• Defense in depth strategies identified and evaluated • Verification of accident analysis computational code applicability and use	

4.3 Formal Review Process

Document reviewers should support a kick-off meeting prior to beginning their review. This meeting may be held during one of the in-process reviews, at the start of the formal review, or both. The meeting may be a joint meeting with the LANL review team. The agenda for the meeting may include:

- Team Orientation
- Walk-down/tour facility
- Define review goals and expectations
- Specification of team roles & responsibilities
- Identify/meet counterparts, other reviewers, and observers
- Review schedule & milestones
- Outline of SAR Review Plan and assignments
- Records Management and QA considerations
- Security considerations

The review team will perform a comprehensive review of final safety basis document only after formal submittal by LANL to the LAAO by the LANL Office of Authorization Basis. The review team will:

- Use DOE-STD-1027-92 to verify the hazard categorization for nuclear facilities
- Verify the adequacy and content of the AB documentation to ensure that it meets DOE requirements and objectives
- Review the technical adequacy of the safety analysis methodology and results using technical judgement, applicable technical support documentation, and walk-downs of the facility and operations
- Review the adequacy of safety analysis by reviewing the assumptions used, ensure that all hazards, relevant scenarios and controls are identified and that reasonable and conservative likelihood of occurrence estimates have been applied to unmitigated accident scenarios
- Obtain independent verification of analyses or calculations utilized in safety basis analyses as necessary
- Review the proposed controls for the prevention or mitigation of potential accident scenarios and the designation of their importance to safety for nuclear facilities. Evaluate whether selection of controls follows the guidance and preferences provided in DOE-STD-3009, Appendix A, section A.4.
- Evaluate defense-in-depth controls to understand the actual level of risk due to the operating facility.
- Evaluate whether sufficient information is presented to enable an assessment of the adequacy of identified controls and an understanding of the residual risk that the DOE is accepting if the facility or operation is authorized.

Reviews will be based on the review criteria provided in section 5 of this procedure. Criteria may be added or deleted as needed. There is no intention to document a response to each criterion. Rather, reviewers are expected to ask themselves these questions as they review the document and generate appropriate detailed comments if the answer to a criterion is “No.”

The review team will generate comments based upon their review. There is no specific form that comments must be entered on, but each comment needs to specify:

- A unique identifier for the team member that produced the comment
- The paragraph number from the area of the document to which the comment applies. If the comment does not apply to a specific area, the abbreviation “Gen.” may be used.
- The page number of the paragraph (if applicable)
- A designation whether the comment is “Essential” or “Suggested” (or equivalently required or suggested)
- The text of the comment. Comments shall not be phrased as questions. The intent of this requirement is that it has been noted that often questions are disguises for unrestricted “fishing expeditions”. The DOE reviewer is responsible for investigating all potential issues to the point that it is either determined to be an issue or is found to not be an issue. Once the issues is validated, the reviewer is responsible for translating the issue into a simple, detailed declaritive statement about a deficiency for action and resolution by the contractor.
- A clear recommendation for how the comment can be resolved should be included. Note: Recommendations must be used with some descretion as the contractor is responsible for producing a defensible document which the Department can approve. DOE personnel should be careful when specifying how deficiencies are to be addressed as they can at this time essentially become writers of the document (a contractor responsibility) and thus loose vital independance and objectivity in relation to the document being produced.
- The DOE directive, code, standard, or clear logical argument that provides the basis for the comment. The intent of this requirement is to supply a traceable logic train back to contractual requirements so that the comment is objective and not, for example, a “pet peeve”.
- Editorial comments shall not be submitted as part of the official comment package but may be included at the end of the review as suggestions if authorized by the review Team Leader. The review team leader may elect to allow editorial comments to be informally provided to LANL.
- Review team members shall refrain from posing philosophical comments.

Reviewers should follow the guidance in rules 1 to 10 of section 3.5 of Reference 7.2.

4.4 Comment Resolution Process

Review team members will provide their comments to the review team leader in support of the scheduled reviews at times specified by the review team leader. The team consolidates and validates team comments in draft form, checks for and removes redundancies, and assembles them into one draft package. The team leader next calls the review team members together and reviews the comments together so that consensus is reached and misunderstandings are clarified before the draft package of comments is discussed with LANL at the review meeting. The draft comments are brought by the review team leader to the 30%, 70%, or 90% meetings with LANL for discussion, verification and negotiation with LANL at the meetings as well as negotiating a documented path forward on comments if possible. During the 30%, 70% , or 90% meetings, the comments are again checked for logical defensibility with LANL. At the conclusion of the meeting, all comments are final (not draft), including LANL peer review

comments, facility comments and DOE comments. The finalized package of all comments are then attached to a DOE transmittal memo and forwarded to LANL for action by the SABM or by the DOE review team leader.

The team leader is expected to work with reviewers in a professional manner on comments that are not supportable as written. The review team leader makes the final determination on which comments are forwarded in the comment set to LANL. Unresolved disputes will be raised to the SABM.

The review team leader will accept the proposed comment resolution package back from LANL as part of the next review cycle. After a cursory review to ascertain that the resolutions appear to be responsive to the submitted comments, the team leader will forward the comment resolutions to the team members. Team members will then review the comment resolutions for acceptability. Team members will work with their assigned counterparts from LANL to identify satisfactory resolutions as necessary. The comment resolution at this stage should have been adequately fostered by the previous review meeting with LANL (30%, 70%, or 90%). The review team and the LANL AB document team will meet to discuss and agree on outstanding comment resolutions if needed. Both LAAO and LANL leaders must be present so that closure can be formally agreed on. Ground rules for the meeting should be that all comments and issues will be resolved, or a path to resolution agreed on, before the meeting is adjourned. There are two possibilities for “forced closure:”

- If the LAAO review team leader is not satisfied with a resolution, then an issue may be slated for inclusion in the SER in the form of conditions of approval to LANL.
- If the LAAO review team leader and the SABM is satisfied with a LANL resolution, but a review team member remains unsatisfied, then the issue can be slated for inclusion in the SER as a minority opinion.

4.5 SER Preparation & Approval

The review team leader, with help from the review team, develops the SER to present the results of the review and provide a recommendation for approval. The SER content should follow the guidance in DOE-STD-1104-96 graded for the specific safety basis document being reviewed. Significant deviations from DOE-STD-1104-96 should be discussed and justified as appropriate. A SER written for a non-nuclear facility should reasonably adapt the intent of DOE-STD-1104.

All review team members may sign the SER (recommended action). If any team member has a significant disagreement with the content of the SER, that disagreement shall be documented in the SER to the team member’s satisfaction, and the team member shall sign the SER.

The SER should discuss the review team’s findings. The basis for the findings should be included. Findings should be categorized based on their significance to safety to clearly distinguish those that are significant enough to warrant recommendation of disapproval of the AB documentation or approval of AB documentation with conditions for approval of the facility or operations.

Prior to issuing the SER, the review team leader shall ensure factual accuracy of findings by

providing LANL line management a copy of the draft SER and other pertinent information for validation of findings.

4.6 Capture Lessons Learned

When possible, the review task will include a conscientious effort to record any lessons learned. One of the drivers for this revision to the LAAO procedure is based upon lessons learned from the McClure report. An example is the incorporation of the 30%, 70% and 90% reviews into this procedure as well as guidance on content of reviews and structure of comments. The review team leader discusses the review with team members, LANL counterparts, and the LAAO SABM. If a substantive change in this procedure is indicated, the review team leader prepares and makes the change. The facts behind such changes, plus other lessons learned, will be recorded in Appendix D.

5. Review Criteria

The criteria presented on the following pages as well as in Appendix E will be used both to focus the review and identify essential comments. There are four sets of criteria. The first set applies to Safety Analysis Reports and similar documents. The second set applies to Technical Safety Requirements and similar documents. The third set applies to Justifications for Continued Operations. The fourth set applies to Unreviewed Safety Question approvals.

Review comments that indicate that one or more of the following criteria are not met will be identified as essential, and must be resolved before the safety document can be approved.

All of the criteria will not apply to every safety basis document. The review team and review team leader determine applicability as part of the review process. There is no requirement for a documented response to individual criteria. Comments that indicate a criterion is not met will provide specific explanation and, if applicable, one or more examples of how the criterion is not met.

Criteria for SARs and Similar Documents

Has LANL completed its internal review according to reference 7.2 and determined that all relevant criteria have been met?

Chapter 1, Site Characteristics

Is the description of the location of the site, location of the facility within the site, its proximity to the public and to other facilities, and identification of the point where EGs are applied (i.e., location of MOI) clearly identified?
1.1 Are aspects of the surrounding area to the site that relate to assessment of the protection of the health and safety of the public clearly identified

1.2 Is the description of the basis for site characteristics in meteorology, hydrology, geology, seismology, volcanology, and other natural phenomena sufficient?

1.3 Have design basis or evaluation basis natural phenomena criteria been identified based upon proven and accepted methods?

1.4 Have sources of external accidents been clearly identified?

1.5 Have nearby facilities impacting, or impacted by, the facility under evaluation been identified?

Chapter 2, Facility Description

2.1 Does the facility overview include a clear discussion of facility inputs, outputs, mission, and history?

2.2 Is a description of the facility structure provided?

2.3 Is a description of the facility process systems provided?

2.4 Is a description of facility confinement systems provided?

2.5 Is a description of the facility safety support systems provided?

2.6 Is a description of the facility utilities provided?

2.7 Is a description of facility auxiliary systems and support facilities provided?

Chapter 3

Hazard Identification

3.1 Have hazards been systematically identified by type, quantity, form, and location?

3.2 Do the hazards and quantities identified cover all operations described in Ch. 2, Facility Description?

3.3 Are the hazards and quantities identified consistent with statements and assumptions made in the hazard and accident analysis detailed throughout Ch. 3?

3.4 Is the hazard category assigned for the hazards identified consistent with the methodology of DOE-STD-1027-92?

Hazard Evaluation

3.5 Is the hazard evaluation methodology (1) stated explicitly, (2) consistent with the analysis methods in reference 7.3, and (3) reasonably tailored to the type and complexity of operations examined?

3.6 Were facility operating personnel involved in the evaluation?

3.7 Was available information used for the analysis (e.g., procedures, process and equipment descriptions, flowcharts) consistent with that reasonably available from the facility?

3.8 Where holes existed in available information, was supporting information generated (e.g., summary descriptions, drawings, and flowcharts) sufficient to provide basic understanding of significant operations, key parameters, and controls?

3.9 Is a complete set of hazard evaluation worksheets/tables available and, if so, do they contain sufficient information?

3.10 Are the bases for consequence and likelihood binning at least qualitatively defined?

3.11 Is the scenario binning technique functional and applied consistently throughout the evaluation?

3.12 Are there any additional significant aspects of facility operations known to the reviewer(s), or noted in facility walkthroughs, that the hazard evaluation fails to cover?

Planned Design and Operational Safety Improvements

3.13 Is there evidence, documented in the SAR or separately, that the hazard analysis generated action items and recommendations that were assessed by facility and operations management?

Defense in Depth/Worker Safety

3.14 Is the selection and identification of safety significant SSC and TSR commitments in these sections consistent with those identified in the hazard analysis and indicative of a coherent process?

Environmental Protection

3.15 Are all major pathways for environmental insult identified and characterized?

3.16 Do the defense in depth measures identified provide reasonable and prudent prevention and mitigation for potential environmental releases?

Accident Selection

3.17 Is the accident selection consistent with the hazard analysis and the associated scenario binning?

3.18 Is the selection of natural phenomena and externally initiated events in accordance with DOE standards?

3.19 Do the accidents selected include all unique and representative accidents that could exceed Evaluation Guidelines and require unique controls?

Accident Analysis

3.20 Are the general principles or references used for accident modeling, including any computer codes used, characterized with sufficient amplifying information to clarify the bases for input and calculation?

3.21 Are standard accident analysis codes used, and is there evidence they were applied correctly, including code validation?

3.22 Is each scenario described in a clear sequence?

3.23 Are the functions of preventive and mitigative features associated with each scenario clearly explained?

3.24 Is documentation needed to support scenario description (e.g., seismic damage) presented, either in detail or as summary of a cited reference?

3.25 Is each complete scenario consistent with the hazard analysis and the rest of the SAR, and does it accurately reflect the findings of separate studies referenced?

3.26 Are the parameters used for calculation supported by technical references and/or reasonable experience from relevant and reliable sources and credible in the context of each overall scenario?

3.27 Are unmitigated consequences clearly identified and directly compared with Evaluation Guidelines to determine if a need for safety class SSC designation exists?

3.28 Does each scenario whose unmitigated consequences exceed EGs document a logical selection of safety-class SSCs and any additional TSR commitments?

3.29 Is there a clear understanding of mitigated consequences given the functioning of safety class SSCs?

Chapter 4, Safety Structures, Systems, and Components

4.1 Are design codes, standards, regulations, and DOE Orders specific to establishing the safety basis of the facility SSCs in this chapter identified.

4.2 Is the following information provided in a summary presentation: (1) identification of safety class and safety significant SSCs; (2) bases for identifying safety SSCs (i.e., accident(s) for which the safety SSC is needed).

4.3 Is each safety-class and safety-significant SSC designated in Ch. 3 covered in Ch. 4?

4.4 Has each safety-class SSC been assessed against standard criteria for safety class SSCs?

The remaining criteria in this section apply to each safety SSC:

4.5 Is there a clear and concise description of the safety function, including identification of specific accidents that the safety SSC prevents or mitigates?

4.6 Is there a description of its boundaries and interface points with other SSCs relevant to its safety function?

4.7 Are supporting and support systems identified?

4.8 Are functional requirements clearly and concisely provided (i.e., limited to those requirements necessary for the safety function)?

4.9 Do the functional requirements specifically address pertinent response parameters and environmental stresses related to each specific accident that the SSC has a safety function?

4.10 Are plant or process parameters that need to be monitored as part of the operation of the system identified?

4.11 Is there a description provided that specifies the principles by which it performs its safety function?

4.12 Are performance criteria necessary for the SSC to meet its functional requirements identified?

4.13 Is there a System Design Description referenced?

4.14 Have TSRs needed to ensure the safety function of the SSC been identified?

Chapter 5, Derivation of Technical Safety Requirements

5.1 Are the codes, standards, regulations, and DOE orders relevant to establishing TSR controls identified?

5.2 Is each control identified in Ch. 3 and 4 for TSR coverage discussed in Ch. 5?

5.3 Is the following information provided in a summary presentation: (1) relevant hazards; (2) major features relied on for protection against each hazard; and (3) the associated TSR coverage in terms of SLs, LCOs, SRs, ACs, and/or design feature designation?

5.4 Are the basic operational modes established in a way that the status of safety systems can be distinctly defined?

5.5 Are controls for auxiliary systems needed to support safety systems identified and included in the TSR?

5.6 Where necessary, are important assumptions or parameters used in the hazard analysis or accident analysis identified for establishing SRs and operability?

5.7 Does the Design Features section identify the important aspects of the passive design features not specifically required to have TSRs?

5.8 Are TSRs from other facilities that can affect this facility's operations identified and summarized?

Chapter 6, Prevention of Inadvertent Criticality

6.1 Are fissile materials and their locations identified? Are potential criticality hazards identified? Do these hazards correspond with Ch. 3 identification?

6.2 Are engineering controls and their design basis and limits identified? Do these provide a basis for design limits and criteria to ensure criticality safety under normal, abnormal and accident conditions?

6.3 Are administrative controls summarized? Do administrative controls include procedures for handling, storing, and transporting fissile material?

6.4 Is the application of the double contingency principle characterized?

6.5 Are SSCs identified for criticality safety and parameters needed for TSR control identified and referenced to the appropriate sections of Ch 3, 4, and 5?

6.6 Is the criticality safety organization identified and described including staffing levels, positions of authority and responsibility, and staff qualifications? (This should address both the institutional organization and the facility element.)

6.7 Are criticality safety procedures characterized?

6.8 Is the training provided to workers for criticality safety described, including facility and activity specific training?

6.9 Are the analytical approaches used to determine criticality limits identified (codes, methods, and analysis techniques)? Are the approaches selected justified and appropriate?

6.10 Are the criticality safety inspections and audits described? Are the responsibilities, authorizations, and the criteria used to select items, functions, etc., included? Is record keeping described?

6.11 Is the criticality infraction program described including discussion of the provisions for infraction recovery? Is there a process for lessons-learned incorporation?

6.12 Are the criticality instrumentation and alarm systems used to detect and mitigate criticality events characterized? Are the methods and procedures used to place equipment described?

Chapter 7, Radiation Protection

7.1 Is the radiation protection program and its organization described?

7.2 Is the ALARA policy and program described?

7.3 Is radiological protection training characterized including that for general employees, radiation workers, radiation protection technicians, supervisors, and mangers involved in operations or maintenance for which radiation protection is required?

7.4 Are administrative limits established and identified for radiation exposure?

7.5 Are radiological practices for exposure control characterized and directly associated with radiological activities?

7.6 Is the basis and content of the dosimetry program characterized?

7.7 Is the plan and procedures for respiratory protection characterized?

7.8 Is the radiological program for material sampling and monitoring characterized?

7.9 Is radiological protection instrumentation characterized? Is calibration addressed?

7.10 Are the procedures for radiological protection record keeping characterized?

7.11 Are the predicted annual exposures for workers characterized? If new operations are addressed, is the exposure estimated and is a basis provided? Are the measured, predicted, and annual radiological exposure limits listed and compared with discrepancies addressed

Chapter 8, Hazardous Material Protection

8.1 Is the hazardous materials protection program and its organization characterized?

8.2 Is the ALARA policy and program characterized to a level consistent with the hazardous materials in the facility?

8.3 Are hazardous materials training requirements characterized for workers, supervisors, and mangers whose work involves hazardous materials, protection, or training?

8.4 Is the program to identify hazardous materials described? Dose the program include evaluation of material hazards and interface with relevant Laboratory programs and requirements?

8.5 Are administrative limits including control levels and exposure times identified and characterized?

8.6 Is the occupational medicine program characterized? Are applicable elements of the Laboratory's program identified?

8.7 Is the respiratory protection program characterized to include the types of equipment used during normal, abnormal, and accident conditions? Are testing, inspection, and other applicable elements of the program identified?

8.8 Is the hazardous material monitoring program and its relation to the Laboratory programs characterized?

8.9 Are hazardous material instrumentation requirements identified? Is the program associated with this instrumentation and its use characterized?

8.10 Are plans and procedures for the documentation and maintenance of the documentation for hazardous materials described?

8.11 Is the hazardous materials communication program described?

8.12 Are the operational predicted annual exposures to workers characterized? If applicable is this based on historical records? If a new operation, are estimates and their bases provided? Are predicted, actual, and limiting exposures compared and discrepancies discussed?

Chapter 9, Radioactive and Hazardous Waste Management

9.1 Is the radioactive and hazardous waste management program and organization described? Are interfaces between facility and Laboratory elements clearly defined? (If necessary, refer to Ch 17 for this information.)

9.2 Are the solid, liquid, and gaseous waste streams and sources, including estimates of inventories, characterized?

9.3 Are waste management and handling processes or treatment systems characterized for radioactive, mixed, and hazardous waste?

9.4 Are descriptions and summaries consistent with hazards identified in Ch 3 and processes described in Ch 2?

9.5 Are emission limits and permits applicable to the waste streams identified?

Chapter 10, Initial testing, In-service Surveillance, and Maintenance

10.1 Is the initial testing program characterized, including that required for a facility modification?

10.2 Is the in-service surveillance program characterized, including provisions for testing and calibration, control and calibration of test equipment, trending of results, programmatic review and training for personnel performing surveillances?

10.3 Is the maintenance program characterized?

Chapter 11, Operational Safety

11.1 Is the conduct of operations program characterized?

11.2 Are the results of facility fire assessments, such as Fire Hazard Analyses, and actual facility walk-downs characterized? Do these summaries put the fire hazards into proper prospective and relate the important fire characteristics of concern?

11.3 Is the fire protection program characterized including fire management policies and philosophies as the basis for the program?

11.4 Is the combustible loading program characterized?

11.5 Is the fire fighting equipment, personnel, training, response procedures, etc., identified or referenced?

11.6 Is the fire prevention inspection program characterized including scheduling, discrepancy resolution, types and frequency of drills, and record keeping requirements?

Chapter 12, Procedures and Training

12.1 Is there a summary of how procedures are selected for development? Is there a description of how procedures are verified as technically correct, verified, and validated for normal, abnormal, and emergency operations, and for surveillance testing and maintenance?

12.2 Is there a summary of the provisions for documenting and controlling procedures including introduction of new procedures and changes in human-machine interfaces covered by procedures?

12.3 Is the process used to determine, develop, verify, and validate the technical content of training characterized? Are the subtopics in Section 12.4.1 of DOE Std 3009-94 addressed?

12.4 Are the provisions to ensure that training reflects the actual facility conditions characterized to include the introduction of new equipment and the reflection of current and modified procedures?

12.5 Is the process for maintaining training records characterized?

Chapter 13, Human Factors

13.1 Is the process for systematically evaluating the importance of human factors in facility safety characterized?

13.2 Are the measures used to perform a systematic inquiry into the human-factors interfaces with safety SSCs identified?

Chapter 14, Quality Assurance

14.1 Is the quality assurance organization and program characterized, including the policies and philosophies that are the basis for the program?

14.2 Is the organization structure of the quality assurance organization characterized including staffing levels, qualifications, positions of authority and responsibilities, interfaces with other safety organizations?

14.3 Are the programs, processes, and procedures used for quality improvement characterized, including those used for correcting adverse conditions that affect quality such as the identification and control of nonconforming materials, parts, and components?

14.4 Is the document and record control management program described as it is associated with quality assurance?

14.5 Are the processes used to ensure quality assurance is integrated into work control process(s), design, procurement, and testing and inspection characterized?

14.6 Is the process for internal independent assessment and external verifications and audits of the quality assurance program described?

Chapter 15, Emergency Preparedness Program

15.1 Is the spectrum of emergencies that the emergency preparedness program is expected to respond to identified and characterized? Is this spectrum consistent with the hazards identified and analyzed in Ch 3?

15.2 Is the emergency response organization identified including authorities of key individuals and groups? Is the communications chain defined for notifying, alerting, and mobilizing necessary personnel? Is the position of the person with overall

authority identified?

15.3 Is the process by which the onset of an operational emergency is recognized characterized? Are methods used to obtain meteorological data and estimate source terms described including specifics of type of code, if such is used?

15.4 Is the provision for notification of emergency response personnel identified and characterized? Are notification methods for DOE, federal, state, county, tribal, and other non-Laboratory organizations defined?

15.5 Are pertinent aspects of emergency facilities and equipment required to support the emergency response program identified and characterized?

15.6 Are the protective actions necessary to minimize the exposure to the public and workers characterized? Is medical and decontamination support characterized? Are important elements of evacuation plans characterized including times, routs, and methods of alerting?

15.7 Is the emergency response training program described to include initial and annual refresher training for all emergency response personnel? Are the drills and exercises that are part of the emergency response program characterized and is the range of different populations exposed to facility hazards characterized? If Ch 12 is referenced, is that information supportive and accurate?

Chapter 16, Provisions for Decontamination and Decommissioning

16.1 Is the conceptual plan for D&D characterized? Does the plan summary address design features to minimize the potential for spread of contamination?

Chapter 17, Management, Organization, and Institutional Safety Provisions

17.1 Is the facility organization characterized to include interfaces with respect to the management of the facility beyond the operating organization?

17.2 Are organizational responsibilities and authorities summarized? Are organizational interfaces characterized in this chapter or referenced to other programmatic chapters?

17.3 Are the bases for staffing levels and skills, knowledge, and abilities of personnel in identified organizations discussed? Are the programs and provisions for monitoring safety performance of this staff described?

17.4 Is the program and procedures used to ensure independent oversight, safety review, USQ determination, and appraisal of the safety performance of the organization characterized?

17.5 Is the configuration and document control program characterized?

17.6 Is the occurrence reporting program characterized?

17.7 Are the policies and programs used to promote an interest and involvement of workers in facility safety, facility a questioning attitude toward safety, and ensure workers understand risks to them and their coworkers described? Are methods used to promote and maintain a safety culture identified?

Common Criteria for all SAR Programmatic Chapters

(To be used with each Ch. 6 to Ch. 17 checklist)

18.1 Are all the relevant major topics of DOE-STD-3009 addressed?

18.2 If a major topic specified in DOE-STD-3009 is not covered due to application of the graded approach, is this discussed?

18.3 Are the applicable codes and standards identified? Are the applicable LANL Work Smart Standards included?

18.4 Do the descriptions of the major program elements reference the existing supporting documentation (i.e., LANL program LIR and/or facility

plan)?

18.5 Do the descriptions of the major program elements include brief abstracts of referenced documentation with enough of the salient facts to provide an understanding of the referenced documentation and its relation to this chapter?

18.6 Do the program descriptions include the administrative controls identified in the Ch. 3 hazard analysis?

18.7 Are cross-references to material in other chapters accurate and is the referenced material adequate to address the subject of the chapter under review?

Criteria for TSRs and Similar Documents

0.1 Has LANL completed its internal review according to reference 7.2 and determined that all relevant criteria have been met?

TSRs - Sections 1 and 2

1.1 Does Sec. 1 include a list defined terms that contains the terms used in the TSR document that require clarification of the intent of their use?

1.2 Are the definitions clear, and are they consistent with standard usage and with the intended use of the terms?

1.3 Does Sec. 1 define the operating modes of the facility clearly in terms of operational conditions? Is there an adequate explanation of the use and application of operating modes?

1.4 Does Sec. 1 include the standard use and application explanations for the following TSR devices:

- Logical Connectors
- Completion Time
- Frequency Notation
- Safety Limits
- Limiting Control Settings
- Limiting Conditions for Operation
- Surveillance Requirements

2.1 Are the safety limits included in Sec. 2 consistent with the safety limits established in the SAR? If no safety limits are required does Sec. 2 so state?

TSRs - Section 3, LCOs

3.1 Do the LCOs identified in the TSR agree with those identified in Ch. 3 and 5?

3.2 Are the operability requirements for each of the SSCs covered by LCOs been clearly identified? Are they unambiguous, concise, so as to not lead to misinterpretation?

3.3 Is the mode applicability adequate for each of the LCOs?

3.4 Is the facility or activity applicability adequate for each of the LCOs?

3.5 Are the remedial actions adequate for the conditions? Do they ensure or complete the necessary safety function or take the facility to a safer condition as they are implemented?

3.6 Does each of the remedial actions have completion times, and are they adequate to allow implementation and ensure safety?

TSRs - Section 4, Surveillances

4.1 Is there at least a one-to-one correspondence between LCOs requirements and SRs?

4.2 Are the SRs explicit enough to ensure the LCOs' requirements are met?

4.3 Does each of the SRs have a completion time?

4.4 Is each of the completion times adequate?

4.5 Does the bases provide enough information to support the SRs and their completion times?

TSRs - Section 5, Administrative Controls

5.1 Is Conduct of Operations as implemented at the Laboratory included?

5.2 Is there a commitment to the appropriate Quality Assurance program?

5.3 Are minimum staffing requirements addressed? Are staffing requirements by mode or operation addressed? (Ref DOE O 5480.22, Attachment 1, II.2.4.e.(3))

5.4 Is there a specific commitment to personnel qualification and training? Does this commitment identify the program or requirement that will govern qualification and training? Is the commitment consistent with information found in the SAR, particularly Ch 12 and 14? (Ref DOE O 5480.22,

Attachment 1, II.2.4.g)

5.5 Is a program for conduct of in-service inspection and testing committed to and is it consistent with the commitments in Ch 10?

5.6 Is there a commitment to configuration management program that includes document control, work control, and change control. Is the USQ program as required by DOE O 5480.21 committed to?

5.7 If criticality safety is applicable, is there a commitment to criticality safety including the physical and administrative controls essential for the program. Is the criticality control program briefly described. Is the description consistent with Ch 6 of the SAR?

5.8 Are material inventory controls addressed? Are all materials requiring control identified? Do material controls identify where the limits apply? Do material limits address how the limits will be controlled?

5.9 Is fire protection adequately addressed.

5.10 If the requirements of 29 CFR 119.119 are applicable, do the TSR administrative controls contain a commitment to process safety management?

5.11 Are radiological effluent control and ventilation filter testing addressed?

5.12 Is radiological protection addressed?

5.13 Is emergency planning addressed? Is there a specific commitment to an emergency plan and is this commitment consistent with the emergency planning SAR programmatic discussion?

5.14 If applicable, are explosive gas or toxic substances monitoring programs addressed?

5.15 Are other safety programs committed to in the SAR and relied upon for worker or public safety in the hazard and accident analysis included and consistent with the SAR?

5.16 Are facility procedures addressed? Does this description include how changes in the TSR are included in the procedures? Are specific procedure types identified that are managed under this control? Do these types encompass all the TSR commitments that would require a procedure? Are other documents referenced that detail how these commitments are met? Are the discussions consistent with corresponding discussions in the SAR?

5.17 Is the contractor organization and management structure addressed?

5.18 Is the safety review and audit process addressed?

5.19 Are reporting requirements for TSR deviations included in the administrative controls? A commitment to report deviations in accordance with DOE requirements should be included.

5.20 Is there a description of the process for revising the TSRs?

5.21 Is recordkeeping addressed? Does the discussion include the types of records that are kept, storage requirements, retention times, and retrieveability requirements?

TSRs – Appendix A, Bases

6.1 Are all technical bases presented in a clear, logical and concise manner that follows the format of the Attachment to DOE 5480.22 and facilitates the evaluation of unreviewed safety questions that may arise from investigating changes to operating parameters of safety controls or potential changes to the margin of safety?

6.2 For each TSR specified (e.g., SL, LCO, LCS), are the technical bases directly based upon specific sections (including references) the hazard or accident analyses contained within Ch. 3 of the SAR/BIO?

6.3 For each TSR specified (e.g., SL, LCO, LCS) that impacts the operation of a safety SSC, are the

technical bases directly based upon safety function and system evaluations (including references) contained within Ch. 4 of the SAR/BIO?

6.4 For each TSR specified (e.g., SL, LCO, LCS), do the technical bases take into account assumptions or uncertainties that have potential impact to the hazard/accident analyses?

6.5 For each TSR specified (e.g., SL, LCO, LCS), are the technical bases for not considering specific operating modes provided?

6.6 For each action statement contained within a LCO, do the technical bases allow for the conclusion that the margin of safety has not been compromised?

6.7 For each action statement contained within a LCO, do the technical bases allow for the conclusion that the completion time for an action is acceptable?

6.8 For each action statement contained within a LCO where actions partially compensate for loss of a safety function, do the technical bases allow for the conclusion that the margin of safety has not been compromised?

TSRs – Appendix B, Design Features

7.1 Is a detailed description of each vital passive component, including functions, dimensions, design criteria, applicable codes and standards, materials used, in-service inspection required, manufacturer, and all details that must be considered prior to alteration, modification, or replacement discussed in a clear and concise manner?

7.2 Is the configuration and physical arrangement, for cases where it is a safety concern, discussed? Are details pertaining to the design provided (e.g., configuration or physical arrangement including dimensions) and the reasoning behind the design?

7.3 For cases where the safe operation of the facility is dependent on any component being constructed of a particular material, is the component and system identified, as well as the special material involved, any in-service inspections required of the material or component, and any special operational considerations such as maximum/minimum temperature, pressure, flow, or chemical concentration?

7.4 Are site characteristics such as the locations of public access roads, collocated facilities, facility area boundaries, site boundaries, nearest residence distances, etc., presented?

Criteria for Approval of Justifications for Continued Operation

0.1 Has LANL completed its internal review and determined that all relevant criteria have been met?

0.2 Are all the relevant considerations, issues, and compensatory measure documented such that an outside reviewer would be able to understand and accept the JCO?

Statement of Issue

1.1 Is the need for this JCO clearly identified and explained?

1.2 Have possible immediate actions to restore the facility to the approved authorization basis been considered and exhausted?

1.3 Have new or altered hazards been described?

Compensatory Measures

2.1 Do compensatory measures result in a level of risk equivalent to the originally approved risk? If there is an increase in risk, can DOE accept this risk for the time specified?

2.2 Are the compensatory measures likely to be effective and reliable?

2.3 Is an acceptable expiration date specified?

2.4 Is the path identified to bring the facility back within the approved authorization basis?

Criteria for Approval of Unreviewed Safety Questions

0.1 Has LANL completed its internal review and determined that all relevant criteria have been met?

0.2 Has the desired/incumbent change been clearly identified and justified? Has the need for this change been identified?

0.3 Have new or altered hazards been systematically identified and analyzed?

0.4 Have alternatives been identified and considered?

0.5 Have programmatic, budgetary, and schedule implications been considered?

0.6 If any new or modified controls are needed, have they been identified and described?

0.7 Have the functions and functional requirements of new or modified safety SSCs been described?

0.8 Do the new or modified controls result in an acceptable level of risk?

0.9 If a JCO is needed, has it been submitted?

6. **Records**

Controlled copies of the following documents will be maintained for the lifetime of the facility.

6.1 Approved AB Document(s) - This document is controlled by LANL.

6.2 SER - This document is controlled by LAAO.

6.3 Changes/USQs - These documents are controlled by LANL.

6.4 Comments Resolutions - Record only, no changes expected.

7. **References**

7.1 DOE-STD-1104-96, “Review and Approval of Nonreactor Nuclear Facility Safety Analysis Reports”

7.2 LANL General Review Plan for Safety Analysis Documents, Draft, 11/99

7.3 DOE-STD-3009-94, “Preparation Guide For U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports”

7.4 DOE O 5480.21, “Unreviewed Safety Questions”

7.5 DOE O 5480.22, “Technical Safety Requirements”

7.6 DOE O 5480.23, “Nuclear Safety Analysis Report”

7.7 DOE-STD-1027-92, “Hazard Categorization and accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports”

Appendix A - Review Team Capability Matrix **(DRAFT UNDER REVIEW AND REVISION DUE TO ONGOING CHANGES TO QUAL CARD STATUS OF PERSONNEL)**

Note: Changes to Appendices will not result in a new revision of this procedure. Instead, the decimal part of the revision number will be incremented. For example, Rev. 2.0 will become Rev. 2.1.

Area of Review Responsibility / Personnel	Team Leader	Site Characteristics	Facility Description	Hazard & Accident Analyses	Sasfety SSCs	Derivation of TSRs	Prev. of Inadvertent Crit.	Radiation Prevention	Haz. Matl. Protection	Waste Management	Testing, Surv., & Maint.	Operational Safety	Procedures & Training	Human Factors	Quality Assurance	Emergency Preparedness	Decontam. & Decom.	Mgt., Org., &and Inst. Safety	TSRs	JCOs	USQs
Chris Steele, LAAO SABM	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Jeff Kimball, DP-45	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Dae Chung, DP-45	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Bonnie Koch, LAAO																					
Daisy Nez, LAAO																					
Nick Sandoval, LAAO																					
Theodore Wald, LAAO																					
Lee Knoell, LAAO																					
George Nolan, LAAO																					
Matthew Pope, LAAO																					
Mike Davister, DP-45																					
John Fredlund, DP-45			X		X																
Bill Froh, DP-45																					
Rick Kendall, DP-45					X																
Rob Vrooman, DP-45				X																	
Ray Cooperstein, DP-45																					
Don Harvey, DP-45																					
Kamiar Jamali, DP-45	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Frank Rowsome, DP-45																					
Doug Minnema, DP-45																					
Jeff Roberson, DP-45																					
Jim Winter, DP-45																					

Appendix B - Generic Review Schedule This section for guidance only

Note: Changes to Appendices will not result in a new revision of this procedure. Instead, the decimal part of the revision number will be incremented. For example, Rev. 2.0 will become Rev. 2.1.

This appendix identifies typical milestones and possible durations (in weeks) for tasks supporting the review of LANL safety basis documents. Since Safety Analysis Reports (and similar documents) and Technical Safety Requirements (and similar documents) are subject to a graded approach, a range of durations is provided. When the duration or scheduling of a task is LANL's responsibility, the duration is just "LANL."

	Safety Analysis Reports, etc.			Technical Safety Requirements, etc.			Justifications for Continued Operation	Unreviewed Safety Questions
	S	M	L	S	M	L		
Review Task Established	0	0.5	1	0	0.5	1	0.5	On delivery
Preliminary Schedule	0	1	2	0	1	2	1	N/A
Identify Team Members	0.5	2	3	0.5	1	2	2	0.5
Qualify Team Members	0.5	1	2	0.5	1	1	1	0.5
Develop Review Plan	0.5	1	1	0.5	1	1	0.5	N/A
30% In-process review	N/A	LANL	LANL	N/A	LANL	LANL	N/A	N/A
70% In-process review	N/A	LANL	LANL	N/A	LANL	LANL	LANL	N/A
90% In-process review	N/A	LANL	LANL	N/A	LANL	LANL	N/A	N/A
Review Kick-off meeting	LANL	LANL	LANL	LANL	LANL	LANL	LANL	N/A
Formal Review	3	3-4	4	3	3	4	<4	<4
Package/Fwd comments	0.5	1	2	0.5	0.5	1	1	0.5
Resolutions from LANL	LANL	LANL	LANL	LANL	LANL	LANL	LANL	LANL
Review resolutions	0.2	0.5	1	0.2	.5	1	<1	<1
Prepare SER	2	3	3	Coordinate w/SAR			0.2	0.2
Approve/Issue SER	0.2	0.2	0.2	Coordinate w/SAR			0.2	0.2
Closeout/lessons-learned	0.2	0.2	0.5	0.2	0.2	0.5	0.2	0.2

Appendix C - Definitions

Note: Changes to Appendices will not result in a new revision of this procedure. Instead, the decimal part of the revision number will be incremented. For example, Rev. 2.0 will become Rev. 2.1.

1. Accident. An unplanned sequence of events that results in undesirable consequences.

2. Accident Analyses. Refers to those bounding analyses selected for inclusion in the safety analysis. These analyses refer to design or evaluation basis accidents. Consequences are compared with Evaluation Guidelines to identify safety-class structures, systems, and components.

3. Administrative Controls. Provisions relating to organization and management, procedures, record keeping, assessment, and reporting necessary to ensure safe operations.

4. Albuquerque Operations Office Safety Management Functions, Responsibilities, and Authorities (AL FRA). Documents AL organizational roles, relationships, and delegations of authority.

5. Approval Authority (AA). Head of a Departmental Element who has been delegated the authority to approve safety basis documentation required to authorize operations.

6. Authorization Agreement. A documented agreement between DOE and the contractor incorporating the results of DOE's review of the contractor's proposed authorization basis for a defined scope of work. Authorization agreements are usually developed for high hazard nuclear facilities (Category 1 and 2). The authorization agreement contains key terms and conditions (controls and commitments) under which the contractor is authorized to perform work. Any changes to these terms and conditions would require DOE approval.

7. Authorization Basis. Those aspects of the facility design basis and operational requirements relied upon by DOE to authorize operation.

8. Basis for Interim Operation (BIO). Documented establishment of a safety basis for current facility operations and operational controls until more detailed documentation is developed and approved by the Department or until the facility is removed from service.

9. Defense-in-depth. Successive layers of barriers used to reduce risks associated with the facility and operations, and constructed in a manner that no one layer is completely relied upon.

10. Design Basis. The set of requirements that bound the design of systems, structures, and components within the facility. These design requirements include consideration of safety, plant availability, efficiency, reliability, and maintainability. Some aspects of the design basis are important to safety, although others are not.

11. Design Basis Accidents (DBA). Accidents that are postulated for the purpose of establishing functional requirements for safety significant structures, systems, components, and equipment.

12. Engineered Safety Features. Systems, components, or structures that prevent and/or mitigate the consequences of all potential accidents including the bounding design basis accidents.

13. Evaluation Guidelines. Hazardous material dose/exposure values that the safety analysis evaluates

against. The intention is that theoretical individual doses/exposures exceeding the Evaluation Guidelines should not occur at a given point, unlike other values, such as emergency planning thresholds. Offsite Evaluation Guidelines are established for the purpose of identifying and evaluating safety-class structures, systems, and components. Onsite Evaluation Guidelines are not required for adequate documentation of a safety basis.

14. Facility. Any equipment, structure, system, process, or activity that fulfills a specific purpose.

15. Hazard. A source of danger (i.e., material, energy source, or operation) with the potential to cause illness, injury, or death to personnel or damage to an operation or to the environment (without regard for the likelihood or credibility of accident scenarios or consequence mitigation).

16. Hazard Analysis. A determination of material, system, process, and plant characteristics that can produce undesirable consequences, followed by the assessment of hazardous situations associated with a process or activity. Largely qualitative techniques are used to pinpoint weaknesses in design or operation of the facility that could lead to accidents.

17. Hazard Classification. Evaluation of the consequences of unmitigated releases to classify facilities or operations into the following hazard categories:

- Hazard Category 1: The hazard analysis shows the potential for significant offsite consequences.
- Hazard Category 2: The hazard analysis shows the potential for significant onsite consequences.
- Hazard Category 3: The hazard analysis shows the potential for only significant localized consequences.

18. Important to Safety. Equipment important to safety is intended to include any equipment whose function can impact safety either directly or indirectly. This includes safety-class, safety-significant, and defense-in-depth equipment, equipment relied upon for safe shutdown, and in some instances, balance-of-plant equipment.

19. Justification for Continued Operations (JCO). A formal means for a Managing and Operating (M&O) contractor to obtain DOE approval of operations on a temporary or interim basis when the current authorization basis requirements can not be fully met.

20. Limiting Conditions for Operation (LCO). The lowest functional capability or performance level of safety-related structures, systems, components and their support systems required for normal safe operation of the facility.

21. Limiting Control Settings (LCS). Settings on safety systems that control process variables to prevent exceeding Safety Limits.

22. Line Management. Any management level within the line organization, including contractor management, who is responsible and accountable for directing and conducting work.

23. Line Organization. That unbroken chain of command that extends from the Office of the Secretary to Secretarial Offices that set program policy and plans and develop assigned programs, to the field element organizations responsible for execution of these programs, to the contractors that conduct the work.

24. Margin of Safety. That margin built into the safety analyses of the facility as set forth in the

authorization basis acceptance limits.

25. Mitigative Feature. Any structure, system, or component that serves to mitigate the consequences of a release of hazardous materials in an accident scenario.

26. Non-Reactor Nuclear Facility. Those activities or operations that involve radioactive and/or fissionable materials in such form and quantity that a nuclear hazard potentially exists to the employees or the general public. Included are activities or operations that:

- Produce, process, or store radioactive liquid or solid waste, fissionable materials, or tritium;
- Conduct separation operations;
- Conduct irradiated materials inspection, fuel fabrication, decontamination, or recover operations;
- Conduct fuel enrichment operations; or
- Perform environmental remediation or waste management activities involving radioactive materials.

Incidental use and generating of radioactive materials in a facility operation (e.g., check and calibration sources, use of radioactive sources in research and experimental and analytical laboratory activities, electron microscopes, and X-ray machines) would not ordinarily require the facility to be included in this definition. Accelerators and reactors and their operations are not included.

27. Nuclear Facility. Reactor and nonreactor nuclear facilities.

28. Potentially Inadequate Safety Analysis (PISA). Situations in which the safety analysis supporting the current/interim authorization basis which DOE relies to limit the risks associated with operation of the facility to an acceptable level is potentially inadequate.

29. Preventive Feature. Any structure, system, or component that serves to prevent the release of hazardous material in an accident scenario.

30. Reactor. Unless modified by words such as containment, vessel, or core, the entire reactor facility, including the housing, equipment, and associated areas devoted to the operation and maintenance of one or more reactor cores. Any apparatus that is designed or used to sustain nuclear chain reactions in a controlled manner, including critical and pulsed assemblies, and research, test, and power reactors, is defined as a reactor. All assemblies designed to perform subcritical experiments that could potentially reach criticality are also to be considered reactors. Critical assemblies are special nuclear devices designed and used to sustain nuclear reactions. Critical assemblies may be subject to frequent core and lattice configuration change and may be used frequently as mockup of reactor configurations.

31. Residual Risk. Total qualitative risk posed by the operations using known hazards and controls information and the identification of areas where risk is not known, unclear or ill-defined.

32. Risk. The quantitative or qualitative expression of possible loss that considers both the probability that a hazard will cause harm and the consequences of that event.

33. Safety Analysis. A documented process: (1) to provide systematic identification of hazards within a given DOE operation; (2) to describe and analyze the adequacy of measures taken to eliminate, control, or mitigate identified hazards; and (3) to analyze and evaluate potential accidents and their associated risks.

34. Safety Analysis Report. A report that documents the results of safety analysis to ensure that a facility can be constructed, operated, maintained, shut down, and decommissioned safely and in compliance with applicable laws and regulations.

35. Safety Basis. The combination of information relating to the control of hazards at a facility (including design, engineering analyses, and administrative controls) upon which DOE depends for its conclusion that activities at the facility can be conducted safely.

36. Safety-class structures, systems, and components (safety-class SSCs). Systems, structures, or components including primary environmental monitors and portions of process systems, whose failure could adversely affect the environment, or safety and health of the public as identified by safety analyses. For the purpose of implementing this Standard, the phrase "adversely affect" means Evaluation Guidelines are exceeded. Safety-class SSCs are systems, structures, or components whose preventive or mitigative function is necessary to keep hazardous material exposure to the public below the offsite Evaluation Guidelines. This definition would typically exclude items such as primary environmental monitors and most process equipment.

37. Safety Evaluation Report (SER). For a given facility or operation, documents that an appropriate review of the authorization basis documents was conducted. The SER also documents the bases for approving the documentation and may recommend any conditions for approval.

38. Safety Limits (SL). Limits on process variables associated with those physical barriers, generally passive, that are necessary for the intended facility functions and which are found to be required to guard against the uncontrolled release of radioactivity and other hazardous materials (this includes releases into the complex and/or the community).

39. Safety-significant structures, systems, and components (safety-significant SSCs). Structures, systems, and components not designated as safety-class SSCs but whose preventive or mitigative function is a major contributor to defense in depth (i.e., prevention of uncontrolled material releases) and/or worker safety as determined from hazard analysis. As a general rule of thumb, safety-significant SSC designations based on worker safety are limited to those systems, structures, or components whose failure is estimated to result in an acute worker fatality or serious injuries to workers. Serious injuries, as used in this definition, refers to medical treatment for immediately life-threatening or permanently disabling injuries (e.g., loss of eye, loss of limb) from other than standard industrial hazards. It specifically excludes potential latent effects (e.g., potential carcinogenic effects of radiological exposure or uptake). The general rule of thumb cited above is not an Evaluation Guideline. It is a lower threshold of concern for which safety-significant SSC designation may be warranted, not a quantitative criteria. Estimates of worker consequences for the purpose of safety-significant SSC designation are not intended to require detailed analytical modeling. Considerations should be based on engineering judgment of possible effects and the potential added value of safety-significant SSC designation.

40. Safety structures, systems, and components (safety SSCs). The set of safety-class structures, systems, and components, and safety-significant structures, systems, and components for a given facility.

41. Technical Safety Requirements (TSR). Those requirements that define the conditions, the safe boundaries, and the management or administrative controls necessary to ensure safe operations for nuclear explosives, and nuclear facilities. TSR for nuclear explosive operations are those controls that provide the greatest qualitative contribution to the protection of the public and facility workers by reducing the risk of meeting or exceeding the NEO Evaluation Guidelines.

42. Unreviewed Safety Question Determination (USQD). A risk-based process to determine if the authorization basis would be impacted and provide contractors at nuclear facilities with the flexibility needed to conduct day-to-day operations by allowing contractor to make limited changes without DOE approval.

43. USQD Safety Evaluation. The record that documents the review of a proposed activity, the scope of the evaluation, and the logic for determining whether or not a USQ exists. Safety Evaluations require professional judgement or technical analysis up to and including a probability and risk assessment.

44. USQD Safety Evaluation Screen. A formal methodology used by the contractor to determine if it is necessary to perform a USQD Safety Evaluation, reduce efforts when change has no safety significance, and focus efforts on changes that are important to safety.

45. Undue Risk. Level of identifiable risk that is excessive and unacceptable to the Department.

Appendix D - Lessons Learned

Note: Changes to Appendices will not result in a new revision of this procedure. Instead, the decimal part of the revision number will be incremented. For example, Rev. 2.0 will become Rev. 2.1.

This appendix captures the lessons learned from safety basis document reviews. When such a lesson results in a change to the body of this procedure, the facts behind the change will be explained here.

1. Insert first lesson here (1/17/01).

A. Submit an electronic copy of all SAR submittals along with the hard copy and ensure they are the same versions.

B. Submit the actual TSR page change with all TSR change requests.

C. Ensure that SAR submittals conform to requirements for submittal spelled out in the LANL review procedure appended to this procedure.

D. The Team Leader or who ever receives a submittal for review or approval shall date the received submittal on the date it was received from LANL because the date on the submittal letter does not always agree with the date received at LAAO. This date is important for contractually required due items.

E. SERs written for SAR approvals shall in detail explicitly address how open findings (e.g., such as indicated in the McClure Report, EH findings, ISM findings, past audits, DNFSB findings, etc.) are closed out. A good example of how to do this is the TWISP SER signed in 2000.

F. TSR change requests do not require a USQD because a TSR change request already DOE approval and a USQD would be redundant paper work.

G. Walkdowns should always be conducted when possible for USQ, SAR, HA, or TSR changes.

H. Always request the actual contractor calculation files in support of AB documents.

Los Alamos
NATIONAL LABORATORY

memorandum

Facility & Waste Operations Division
Office of Authorization Basis (FWO-OAB

To/MS: Chris Steele, DOE-LAAO, SABM, MS A316
From/MS: Kent Sasser, FWO-OAB, MS K557
Phone/Fax: 5-2540/7-8136
E-mail: msasser@lanl.gov
Symbol: FWO-OAB:00-002
Date: September 14, 2000

Subject: Review Criteria for Performing Reviews

Until further notice, Draft D of the General Review Plan for Safety Analysis Documents, dated November 1999, will be the review criteria and review procedure LANL will formally use for performing reviews of safety analysis documents.

KS:djb

Cy: Desmond Stack, TSA-11, MS K557
Eric McNamara, ESH_3, MS K489
Kent Sasser, FWO-OAB
FWO-OAB Files

APPENDIX E

From: Patrick McClure[SMTP:pmcclure%lanl.gov@internet.al.gov]
Sent: Tuesday, November 23, 1999 9:55 AM
To: cbell%lanl.gov@internet.al.gov; dseidel%lanl.gov@internet.al.gov; jbueck%lanl.gov@internet.al.gov; eedmonds%lanl.gov@internet.al.gov; mil0037%ibm.net@internet.al.gov; lrestrepo%ibm.net@internet.al.gov; aneuls%lanl.gov@internet.al.gov; goldies%starpower.net@internet.al.gov; jlmcatee%lanl.gov@internet.al.gov; david_pinkston%ccmail.gmt.saic.com@internet.al.gov; msasser%lanl.gov@internet.al.gov; cleasure%lanl.gov@internet.al.gov; dhrichardson%lanl.gov@internet.al.gov; Steele, Christopher; Koch, Bonnie; schepens%lanl.gov@internet.al.gov; ars%lanl.gov@internet.al.gov; dvc%lanl.gov@internet.al.gov; dstack%lanl.gov@internet.al.gov; dgordon%lanl.gov@internet.al.gov
Cc: cleasure%lanl.gov@internet.al.gov; dhrichardson%lanl.gov@internet.al.gov
Subject: Final of generic review plan

SAR_RP_DraftE.doc

Hi everyone,

The generic review plan is finished for now. Remember, this is a living document that will be tailored by DOE and LANL to meet specific needs. In addition, some items are still being negotiated.

Lets try and get the document into the hands of as many people as possible. Particularly to those individuals producing documents and doing reviews.

Call me if there are issues (667-9534).

Patrick

Los Alamos National Laboratory

General Review Plan for Safety Analysis Documents

Draft

November 1999

CONTENTS

1.0 INTRODUCTION

The purpose of this General Review Plan is to provide guidance for the review process for Safety Analysis Reports (SARs), Technical Safety Requirements (TSRs), and similar safety documents for nuclear facilities. While focusing on the Laboratory's internal review process, the Plan also provides guidance on integrating external reviews (e.g., Department of Energy [DOE]) into the overall process. The formal, structured approach to performing SAR reviews described in this Plan is intended to improve the quality of such reviews, and thus improve the quality of SARs produced by the Laboratory.

This Plan should be used to guide the review process for safety documents for nuclear facilities. This Plan is intended to be used as the basic framework for such review, with the expectation that facility-specific modifications be incorporated to tailor the review for each individual facility and safety document (i.e., a graded approach). A facility-specific review plan, or equivalent, should be developed at the beginning of the review process to establish the logistics and review emphasis for that particular review. In addition, this document does not include all process details. Other Laboratory requirements and guidance documents, division implementing procedures, memoranda of understanding, etc., are needed to establish the full set of direction and guidance for conducting safety analysis document reviews.

This Plan is written for a SAR prepared in accordance with DOE Order 5480.23 (and amplifying guidance in DOE-STD-3009) and TSRs prepared in accordance with DOE Order 5480.22. It may also be used for safety analysis documents other than SARs, such as a Basis for Interim Operation (BIO) or a Safety Assessment (SA), and for a SAR supplement or a major addendum to a SAR. If so applied, the process and review criteria in this Plan should be tailored to address the content and complexity of those documents. This Plan may also be used, tailored as necessary, to review safety document for non-nuclear facilities. **[To avoid tedious repetition, the term "SAR" will be used in this Plan as a representative term that is intended to include all safety analysis documents addressed by this Plan (i.e., SARs, TSRs, BIOs, SAs, etc.).]**

Because the Laboratory is in the process of revising or updating the SARs for many of its existing nuclear facilities, this Plan is written specifically for reviews of SARs that address this phase of facility life cycle. SARs developed for other facility life cycle phases might require a somewhat different review process and criteria. For example, a major new facility would require a Preliminary SAR and Final SAR. The reviews would use a process and criteria that are similar to, but somewhat different than a review for an existing facility. This issue of this Plan does not attempt to address the variations that would be necessary to review SARs other than those written for operating an existing facility.

This Plan is based on the principles for a SAR review that are discussed in DOE-STD-1104, *Review and Approval of Nonreactor Nuclear Facility Safety Analysis Reports.* Although much of this standard is written for the DOE review process and not applicable to internal Laboratory reviews, the fundamental principles are applicable. This Plan also has significant basis in the history of the SAR program at the Laboratory and other DOE sites. Preparers of this Plan have observed and participated in the SAR program at the Laboratory and other DOE sites for many years. Over time, successful processes become evident, as do processes that usually fail.

Sec. 2 describes the review objectives and fundamental principles of the Laboratory's SAR review program. It is important that personnel planning SAR reviews be cognizant of and understand these principles. This Plan cannot provide all the detailed direction necessary to plan and execute the review of each facility SAR. The process described in this Plan must be applied as appropriate for each particular review. The principles in Sec. 2 should be considered as the foundation for planning and executing a SAR review. If these principles are maintained, then the process is likely adequate, regardless of minor variations.

Sec. 3 describes the recommended review process. Sec. 3.1 discusses the overall structure of the review process. The overriding concept is that the review must be integrated with the SAR development effort and managed as a Project. This concept is inherent in implementing integrated safety management. Also, past experience has shown that unstructured, unmanaged SAR development and review efforts usually do not succeed.

Sec. 3.2 describes the roles and responsibilities of the organizations involved in the SAR review process. The organization responsible for facility operations is responsible for facility safety, as established by Laboratory integrated safety management policy, and is ultimately responsible for the quality of its SARs. ESH-3 is responsible for implementing the SAR review program at the Laboratory to assist facility operators develop adequate SARs. Independent review teams will be established for each effort and are responsible for planning and performing specific reviews.

Sec. 3.3 provides guidelines for review team composition, team leader and member qualifications, team member selection, and other aspects of assembling review teams.

Sec. 3.4 identifies and describes the major process steps. The key features of the process are the initial establishment of expectations at the beginning of the SAR development effort, interim milestones with deliverables, and review of the interim deliverables by the SAR review team. These process features are essential to obtaining a final product that generally meets the expectations of the review team and does not require substantial rework at the end of the development effort.

Sec. 3.5 discusses general ground rules for review comments. In the past, significant resources have been expended on preparing and responding to review comments that do not contribute to meeting the objectives of the SAR review and do not notably improve the quality of the SAR. The ground rules are intended to focus review comments on important issues that merit time and effort to resolve. To realize this intended efficiency, the review must be disciplined to follow these rules.

Sec. 4 provides suggested criteria for conducting a SAR review, including general criteria and detailed checklists. The checklists are based on the requirements in DOE Order 5480.23 and the guidance in DOE-STD-3009. They are intended as guidelines for focusing the review.

2.0 PHILOSOPHY

2.1 STD-1104 Principles

This Review Plan is based on the principles of DOE-STD-1104-96, *Review and Approval of Nonreactor Nuclear Facility Safety Analysis Reports*. This section excerpts the applicable principles and discusses how they should be applied to Laboratory reviews.

- "DOE-STD-3009-94 provides approved guidance for meeting the requirements of DOE 5480.23."

  The Laboratory endorses STD-3009 as the preferred standard for format and content of SARs for nonreactor nuclear facilities. STD-3009 should be used in the review process as the basis for determining SAR content adequacy. A graded approach may be used to adjust the level of detail of the material in the SAR, as described in STD-3009.

- "Independent review of a SAR facilitates achieving defensible approval of that SAR."

The key point here is the independence of the review. The internal Laboratory review should be performed by independent personnel.

- "The objective is not to document a large number of issues but to contribute to improving the SAR to meet the mission established by DOE 5480.23 and the intent of amplifying guidance (i.e., to provide assurance that the SAR appropriately establishes the safety basis of the facility)."

  This principle states the fundamental objective of the SAR review: to contribute to improving the SAR to meet the mission established by DOE 5480.23 and the intent of amplifying guidance (i.e., STD-3009). SAR reviews should be managed to ensure that this objective is understood and followed by all involved in the process. The reviewers' mission is to help improve the SAR.

- "It is not expected that SAR reviews will be conducted completely separate from SAR preparation. This Standard encourages interface between the two processes to develop familiarity with the facility's safety basis, to respond to requests from the SAR preparer for early identification and resolution of potential issues, and to discern the scope of subsequent SAR review and approval documentation required."

  To achieve the necessary interface between the SAR development team and SAR review team, the Laboratory's SAR review process should include formal reviews throughout the development effort. It is absolutely essential to identify the important issues early in the process. The review process must be disciplined to ensure that these issues are identified early and are not raised at the very end of the process.

- "DOE strives for an effective, streamlined SAR review and approval process while still achieving an acceptable level of safety assurance. This Standard advocates proper planning for a review and encourages an integrated review process where all parties with vested interest in a facility safety basis coordinate throughout the review and approval of a SAR."

  A streamlined internal SAR review process will be achieved by planning for an efficient review and managing the effort to stick to the plan. To accomplish an efficient review: (1) the review team leader must ensure that the review team is provided adequate interface with the SAR development team and facility operating personnel; (2) the review team must limit their input to substantive issues and must participate constructively in resolving issues; (3) the facility operating organization must support the review by providing necessary information and making a good faith effort to resolve review concerns; (4) all involved must work to complete their activities on schedule; and (5) a conflict resolution process must be established to prevent delays caused by differences of technical opinion.

- "A significant issue identifies a problem or concern that affects the utility or validity of the safety basis documentation. Such issues are generally those involving: (1) hazardous material or energy release with significant consequences to the public, worker, or environment that will otherwise be left without coverage in the SAR; (2) technical errors that invalidate major conclusions relevant to the safety basis; or (3) failure to cover topical material required by DOE directives and guidance on SARs."

  Reviewers should be instructed to limit their essential comments to substantive issues as defined here. Guidelines for comments are provided in this Plan. Review team leaders should review all comments to ensure that the comments are technically accurate, address only substantive issues, and comply with these guidelines.

- "The core of the review effort is assessing the hazard and accident analyses in the SAR because these analyses are the primary source of original material with which the remainder of the SAR is aligned."

  Laboratory internal reviews should emphasize the hazard and accident analyses. The programmatic SAR chapters are important and the safety programs must be adequately described, but the review effort must place its primary emphasis on ensuring that the hazard and accident analyses are adequate and that appropriate safety features (controls) have been identified.

- "Well before SAR submittal for approval, plans should be developed in coordination with the facility contractor where support of the contractor will be required (e.g., briefings on the SAR, facility walkthroughs, issue resolution)."

  Laboratory SAR reviews should be planned in advance to identify the review team and begin preparing for the review prior to its start. Reviewers should be provided the opportunity and should be allotted the time to become familiar with the subject facility and operations prior to beginning the review. These preparations should include facility tours, presentations by facility personnel, and review of facility documents.

2.2 Laboratory Review Program Principles

This section summarizes the principles of the Laboratory's review program, which are based on the principles noted in the previous section from STD-1104.

- **The SAR review program will contribute to the Laboratory's implementation of Integrated Safety Management by improving the quality of the safety basis for nuclear facilities.** Two of the five core functions of the Laboratory's Integrated Safety Management (ISM) System are "Analyze Hazards" and "Develop/Implement Controls." The SAR process is a key vehicle for performing these functions for nuclear facilities. The objective of the SAR Review Program is to provide Laboratory management assurance that hazards have been analyzed adequately, that adequate controls have been identified, and that the facility can be operated safety if the controls are properly implemented.

- **SAR reviews will promote the review program objectives: to improve the quality of the SAR and meet Laboratory requirements that implement DOE Order 5480.23 and the guidance of DOE-STD-3009.** The SAR review team should conduct their review in the spirit of providing a service to the facility organization responsible for the SAR with the goal of completing a SAR that meets DOE requirements and expectations. The SAR development team and the responsible facility operating organization should be open to input from the review team, and should take the necessary actions to produce a SAR that will meet the requirements of DOE Order 5480.23 and the guidance of STD-3009.

- **SAR reviews will be managed and disciplined.** SAR reviews will be managed like projects and integrated with SAR development efforts. The SAR review team should interface with the SAR development team at key points throughout the development process. The SAR development team and facility operating organization should cooperate with the review team and provide interim deliverables. The review team should conduct the review on schedule and provide reasonable input that will improve the quality of the SAR. The SAR review team should participate constructively to resolve issues and bring the review to closure in an expeditious manner.

- **SAR reviews will be criteria-based and focus on substantive issues.** Reviews should determine adequacy by assessing compliance with Laboratory requirements that implement DOE Order 5480.23, DOE-STD-3009, and other requirements for safety analysis documents. Review comments should address only substantive issues and should be based on deviations from applicable requirements.

- **SAR reviews will be performed by independent, qualified personnel.** SAR reviewers should be independent of the development of the SAR and should have appropriate technical knowledge, training, and experience.

3.0 PROCESS

3.1 Review Project Structure

To be successful, the SAR development, review, and approval efforts must be coordinated and managed like an integrated project. A structured approach works best to accomplish a large task involving several organizations. The project structure defines the individual tasks, identifies organizational responsibilities, formalizes interfaces between organizations, and establishes the schedule. The review process outlined in this Plan is based on an integrated project concept.

DOE-STD-1104 encourages interface between the SAR development review processes to facilitate the review process and for early identification and resolution of potential issues. Lack of reviewer interaction during the SAR development process often leads to major issues raised by reviews conducted very late in the development process. The resolution of such issues can have major impact on cost, schedule, and facility operations. It is essential to identify major issues early in the process. Therefore, early and continued interface between the review team and development team is a key element of the process outlined in this Plan.

While interaction is necessary, the review team must maintain a certain degree of independence from the development team. The review team must not interject themselves into the development process. A common approach is to conduct a small number of interim reviews of portions of the SAR prior to a review of the entire document at the end. This approach can provide sufficient interface and the opportunity to identify significant issues while maintaining review team independence.

Managing the SAR effort like a project also promotes completing the effort in a reasonable period of time. Experience has shown that SAR development and reviews tend to drag out over extended periods of time unless the efforts are disciplined. Activities must be scheduled, milestones must be established, resources must be identified and provided, and the schedule must be used to manage the work. Organizations must be held accountable for completing their assigned tasks on time, and this includes review organizations as well as development organizations.

One factor that makes managing a SAR effort challenging is the lack of a single Project Manager with the authority over all Laboratory organizations involved in the process. The organization responsible for developing the SAR is assigned the responsibility for overall Project coordination, but the success of the effort depends on each organization assuming responsibility for their assigned tasks and managing their own efforts to comply with Project requirements and schedules.

The process outlined in this Plan involves several sets of deliverable packages and several reviews for each SAR. To be accomplished efficiently, the entire process should be defined and scheduled at the beginning of the effort. The specific reviews and the scope of each review should be defined early in the

project, typically in a Project Review Plan. Interim milestones and reviews should be scheduled. Advance planning is important to identify necessary resources and allow review organizations an opportunity to obtain them.

The remainder of Sec. 3 provides the details of the review process. This process should be used for all Laboratory SAR reviews, although it must be recognized that circumstances sometimes necessitate modification to this process.

3.2 Roles and Responsibilities

This section provides the important roles and responsibilities for the SAR review program. A limited number of SAR development responsibilities are included where important to clarify interfaces with the review process. This Plan does not intend to address all SAR development responsibilities. In addition, this Plan is focused on the technical process and does not address certain administrative responsibilities of management, such as obtaining the funding necessary to execute the SAR review program.

3.2.1 Laboratory Senior Management (Owning Division Director)

The Owning Division Director (ODD) has the following responsibilities.

- Oversee the SAR development process and take necessary actions to ensure schedules are met.
- Review and approve proposed revisions to the SAR scope, schedule, and funding based on agreed upon thresholds.
- Provide resolution for issues raised by the Laboratory review team that cannot be resolved with facility personnel.
- Assist in implementing lessons-learned from Laboratory SAR reviews (e.g., revisions of LIRs and LIGs).
- Provide Laboratory approval of SARs.

3.2.2 Facility Manager or Owning Division Director Designee

The Facility Manager (or other individual assigned responsibility for the SAR by the ODD) has the following responsibilities.

- Develop the overall Project Plan and schedule.
- Establish change control thresholds for Project scope, schedule, and funding.
- Obtain senior Laboratory management (ODD or equivalent) approval of Project Plan, schedule, and funding profile.
- Identify necessary revisions to Project scope, schedule, or funding if change control thresholds are exceeded, and obtain senior Laboratory management approval.
- Provide a single point of contact for the SAR review process.
- Manage the SAR development effort.
- Distribute documents for review.
- Coordinate the logistics of meetings with review teams.
- Provide facility tours and arrange for process walk-downs and interviews with facility personnel as needed for the review process.
- Provide facility training as needed for reviewers.
- Provide necessary facility-specific security guidance for reviewers.
- Manage resolution of review comments.
- Request ODD resolution of issues that cannot be resolved with the review team.

3.2.3 Laboratory Review Organization (ESH-3)

The ESH-3 Group Leader or designee is responsible for the following institutional review program responsibilities.

- Manage the overall SAR review program.
- Prepare and implement formal procedures for ESH Division activities described in this Plan.
- Assist Facility Managers develop Project Plans.
- Develop and maintain an integrated schedule for all SAR development projects requiring reviews.
- Provide a single review program interface with DOE and senior Laboratory management.
- Maintain records of SAR reviews, including comment closeout.
- Input open issues to the Laboratory Action Tracking system as required and update as necessary.
- Transmit final, Laboratory-approved SARs to DOE indicating successful institutional review.
- Maintain review records to include Review Plan, comments, and comment closures, as well as any other documentation confirming that reviews are conducted appropriately and adequately.

ESH-3 also has program management and oversight responsibilities for specific reviews. Note that review team leader and team member responsibilities are specified separately, below, although these individuals may be members of the ESH-3 staff. The ESH-3 Group Leader or designee has the following responsibilities.

- Appoint a qualified review team leader to manage the Laboratory review and serve as the single point of contact for the review.
- Receive comments from the internal review team, DOE, and other external reviewers and deliver a single set of comments to the Facility Manager.
- Assist review teams develop specific Review Plans and review criteria.
- Participate in comment resolution meetings.
- Review proposed resolutions to DOE or external comments to ensure adequate quality and to identify subsequent issues raised during the resolution of the comments.
- Develop lessons learned and share with DOE.

3.2.4 Review Team Leader

The review team leader has the following responsibilities.

- Manage the internal Laboratory review as specified in the Review Plan and applicable ESH procedures.
- Develop the Review Plan.
- Ensure appropriate quality assessment measures are included in the Review Plan.
- Ensure the review schedule allots appropriate time for review.
- Advise the Facility Manager if schedules cannot be maintained or the scope needs to be changed.
- Identify and obtain qualified review team members, including replacements, as required.
- Document the qualifications of team members and place in review records.
- Coordinate site visits, facility walk-downs, review meetings, etc., with the Facility Manager.
- Ensure team members obtain proper training needed for site visits and facility walk-downs.
- Consolidate reviewer comments.
- Review all comments to ensure they are categorized properly, are technically accurate, and comply with the rules for comments, and screen out inappropriate comments.

- Submit comments to ESH-3 for submittal to the Facility Manager.
- Participate in discussions of issues during review meetings and comment resolution meetings and provide final team positions when necessary.
- Track open comments to resolution.
- Assess the acceptability of facility comment resolution proposals and final closeout of comments.
- Outbrief senior Laboratory management if so requested.
- Provide the ODD a recommendation for Laboratory approval based on completion of the review and satisfactory resolution and closeout of comments.
- With the approval recommendation, provide the ODD dissenting team member opinions and maintain documentation as part of the review record.

3.2.5 Review Team Members

Review team members have the following responsibilities.

- Provide qualifications for assigned review element to review team leader.
- Assist the team leader prepare the review plan, as requested.
- Participate in facility tours, walk-downs, and interviews as indicated in the Review Plan.
- Obtain required training for facility access.
- Perform review as scheduled.
- Use checklists and other relevant guidance documents as provided to the SAR preparers.
- Document comments and their bases in accordance with the Review Plan
- Assign a response code to each comment (Essential or Suggested).
- Ensure comments comply with the rules for comments.
- Participate in comment review sessions with facility personnel.
- Review proposed comment resolutions for adequacy and concur if appropriate.
- Review revised document for adequate incorporation of comment resolutions.
- If unable to participate in review as planned, inform the team leader immediately.

3.2.6 DOE Review Organization

The DOE review organization has the following responsibilities. Note that this list is provided for information and is not intended as a Laboratory assignment of these responsibilities to DOE. This list represents the Laboratory's understanding of the responsibilities that DOE has assigned to DOE personnel who review Laboratory SARs, and is intended to assist Laboratory personnel coordinate SAR review activities with DOE. The DOE Los Alamos Area Office is currently responsible for conducting reviews of Laboratory SARs.

- Concur with the Project scope and schedule during initial Project planning.
- Concur with changes to the Project scope and schedule that are proposed during SAR development and review.
- Establish qualified review teams.
- Manage the DOE portion of the review.
- Ensure that comments comply with the rules for comments and are identified as Essential or Suggested.
- Provide a single set of formal comments for each review phase to ESH-3 for distribution to the Facility Manager.
- Participate in joint comment review sessions and comment resolution meetings as necessary.

- Provide written interpretations of applicable Laboratory/DOE contractual commitments associated with DOE orders and standards, as requested.
- Develop a lessons learned program and share it with the Laboratory.
- Develop and issue the Safety Evaluation Report (SER), or equivalent.
- Provide recommendation for approval/disapproval to the DOE Approval Authority.

3.2.7 Laboratory Support Organizations

Technical expertise relevant to SARs resides in many Laboratory support organizations. These organizations support SAR reviews by providing subject matter experts (SMEs). The following organizations are assigned institutional responsibility for the indicated technical areas and should normally provide the SME to participate in the SAR review for their area of expertise. However, resources from other organizations should be identified if the indicated organization participated in preparing the SAR.

Program/Technical Discipline	Responsible Laboratory Organization(s)
Criticality Safety	ESH-6
Radiation Protection	ESH-1, 4, and 12
Hazardous Material Protection	ESH-2 and 5
Radioactive and Hazardous Waste Management	ESH-17, 18, and 19 and FWO
Maintenance	FWO
Fire Protection	FWO
Training	ESH-13
Quality Assurance	ESH-14
Emergency Response	S-8

Organizations providing SMEs for SAR reviews have the following responsibilities.

- Provide qualified SMEs to participate on Laboratory SAR review teams.
- Provide the same individual for all phases of the review of a single SAR, if reasonably possible.
- Ensure SMEs conduct reviews in accordance with applicable Review Plans as directed by review team leaders.

3.3 Review Team/Member Guidelines

This section provides guidelines for the composition of review teams and member qualifications. One SAR review program principle is that reviewers are independent and technically qualified.

A review team is typically comprised of SMEs in the technical disciplines necessary to cover the scope of the subject SAR. The size of the team can vary depending on the scope and complexity of the SAR and other factors. The review team leader should ensure that the team provides adequate coverage for all technical areas. The team should include several members with expertise in hazard analysis and accident analysis, as this is the core of the review effort. The review team should include other personnel with diverse experience in safety and health and facility operations to provide support for a thorough assessment of the facility safety basis.

A typical challenge for staffing a SAR review team is the availability of review personnel. This is especially difficult for a review that includes several interim reviews spaced over several months. The review must be managed to minimize team member turnover and mitigate inefficiency introduced by

replacement reviewers when turnover is unavoidable. The review team leader should attempt to obtain commitments from members' managers to make them available for the entire review. One way to mitigate this difficulty is to appoint more than one member for the key disciplines.

Experience has shown that qualified reviewers are essential to a successful review. Although technical competence and experience are the most critical qualifications, they are not sufficient by themselves to ensure that a quality review will be performed. Team members must also understand DOE's safety analysis concepts and exhibit the judgement and discipline necessary to conduct their assigned review tasks in accordance with the review plan.

Review team members should meet the following general qualifications. More detailed qualification requirements may be specified in Laboratory requirements or guidance documents or in ESH procedures.

- Knowledge of the general purpose, function, organization and content of SARs and TSRs as specified by DOE Orders 5480.22 and 5480.23 and DOE-STD-3009.

- Familiarity with the DOE Orders and standards and the Laboratory's Work Smart Standards applicable to the assigned functional area.

- General knowledge of hazard analysis/accident analysis, such as that covered by the DOE-STD-3009 training course or equivalent.

- Previous experience in technical aspects of preparation or review of safety documents for DOE facilities or comparable commercial industry SARs.

The team leader should have extensive experience involving safety analyses for nuclear facilities. Additionally, the team leader should also have demonstrated leadership ability and strong oral and written communication skills.

The review team leader will obtain qualification statements for each team member, compile them (to include the team leader's statement), and submit them to ESH-3 for maintenance as review records in accordance with ESH procedures.

Another critical qualification for review team members is that they be independent of the SAR development process. Independent personnel are typically considered those who have not contributed to preparing the SAR and who are not associated with the organization(s) responsible for preparing the SAR. However, there are various interpretations of this general theme and a more definitive criteria is usually necessary. Laboratory policy on independence of SAR reviewers will be established outside this Plan.

The importance of quality reviewers makes it imperative that Laboratory review teams be staffed by the best available personnel, regardless of organizational affiliation. The ESH Division is assigned responsibility for Laboratory safety oversight and is staffed with subject matter experts in diverse safety disciplines. It is expected that ESH will provide the majority of SAR review team members. However, other Laboratory organizations, subcontractor organizations, operating contractor organizations from other DOE sites, and consultants also provide a pool of subject matter experts that should be considered when assembling a review team.

3.4 Detailed Review Description

This section outlines and describes the individual process steps for a SAR review. The steps outlined in this section are intended as a general guide and the process should be tailored as necessary for each

specific review. Some of the following activities must be conducted in parallel–the order of presentation is generally but not always serial. This description does not include some activities that are not central to the process–some of these are listed in Sec. 3.2, above. In addition, the process of determining when a SAR must be developed or revised is outside the scope of this Plan.

1. Develop the Project Plan and Schedule

The Facility Manager (or designee) will develop a project plan and schedule for SAR development, review, and approval. The project plan may be a simple scope statement or a comprehensive document establishing detailed activities for SAR development. At a minimum, the Project Plan should establish the scope of the SAR, applicable standards, requirements, expectations, and required resources. ESH-3 (and the review team leader, if appointed at this time) should be consulted to ensure that the plan complies with Laboratory authorization basis requirements and that the schedule includes adequate provisions for the review process. The Facility Manager will obtain approval of the Project plan and schedule from the ODD.

2. Present the Project Plan and Schedule to the DOE Approval Authority

The Facility Manager and ESH-3 will present the Project Plan and schedule to the DOE Approval Authority and obtain concurrence. Upon concurrence of the DOE Approval Authority, the Facility Manager may initiate start of the development effort.

3. Appoint the Review Team Leader

Once a SAR development effort has been initiated, ESH-3 will appoint a review team leader. The review team leader may be appointed prior to initiation of the development effort to represent the review process in Project planning. If the appointment is after initiation of the development effort, ESH-3 will represent the review process during planning activities.

4. Plan the Review

The team leader will initiate planning for the review by: (1) establishing contact with the Facility Manager or designated individual responsible for the SAR development effort; (2) identifying review team requirements (areas of expertise and resources); (3) identifying individuals to serve on the review team; and (4) monitoring progress of the development effort. The team leader will compile the qualifications of candidate review team members and ensure that each candidate meets qualification requirements prior to final appointment.

5. Assemble the Review Team

The team leader will identify the necessary SMEs to serve on the review team. Sec. 3.3 provides guidelines for review team composition and member qualifications. The review team will be assembled when necessary over the course of the review to perform necessary team functions. Reviews performed in several phases over several months typically do not require the participation of all team members for all phases of the review. The team leader will coordinate team member participation depending on the scope of each phase of the review.

6. Conduct the Review Kick-off Meeting

In coordination with the Facility Manager, the review team leader will schedule a Review Kick-off Meeting at the appropriate time. This will vary project to project. The Review Kick-off Meeting should be early enough in the process to allow adequate preparation time, but not before SAR development has progressed sufficiently that there is confidence in the schedule for delivery of the first review package.

Typical expectations and goals of the Review Kick-off Meeting are presented in Table 1. The primary objective is to prepare the review team in advance of receipt of the review package. Advance preparation will enhance the efficiency of the review by reserving the scheduled review time for the

review itself. It is also important to ensure that review team members are cognizant of quality assurance and security requirements from the very beginning of the effort.

7. Prepare the SAR Review Plan

Prior to the start of the review, the review team will prepare the specific SAR Review Plan. The scope of the plan may vary depending on the scope and complexity of the review effort, and may include the following elements.

- Review objectives and expectations.
- Review milestones and schedules.
- Team roles and responsibilities.
- Protocols and work methods.
- Quality assurance, security, and records management considerations.
- Interfaces with other review groups (e.g., DOE).
- Review documentation (interim and final).
- Review criteria.

Additional review plan format and content guidelines may be specified in ESH procedures.

8. Perform Reviews

Reviews will normally be performed at several stages in the development process. Table 1 shows typical examples of the material that could be included in 30%, 70%, and 90% reviews. These points are recommendations−the number of reviews and material included in each review should be tailored to the specific SAR. Milestones should be established in the initial planning, but the detailed contents of each review package should be negotiated by the Facility Manager in consultation with ESH-3 and the review team leader. ESH-3 will coordinate the planned review points with the DOE review team leader to facilitate DOE reviews at interim milestones.

Reviews should be based on review criteria based on applicable requirements. Sec. 4 to this Plan includes checklists that could be used as guidelines for performing SAR reviews. These checklists are general and best used to focus the reviews on important issues and to check for completeness. More detailed review criteria should be developed and used by SMEs to conduct their assigned reviews. These criteria may be included in the Review Plan, but they may be informal. However they are documented, it is important that any detailed criteria used to guide the review address significant issues and be based on requirements, not reviewer preferences. See Sec. 3.4 for a discussion of rules for comments.

Reviews will be conducted and comments documented on a comment form to facilitate resolution. ESH procedures may specify a preferred format for documenting Laboratory review comments. Comments will be designated as Essential or Suggested and segregated before submittal. Essential comments must be resolved, but Suggested comments do not require resolution. The review team leader will consolidate all team comments and review them for technical accuracy, compliance with the rules for comments, and proper categorization. Inappropriate comments and comments that do not comply with comment rules should be screened and not submitted. This is an important responsibility for the review team leader and necessary to ensure an efficient review process. Team members who disagree with the disposition of screened or downgraded comments will be provided the opportunity to submit a dissenting opinion to the review team leader. Dissenting opinions will be forwarded to the ODD responsible for approving the SAR for consideration.

The review team leader will forward the final set of comments to ESH-3. ESH-3 will assemble them with any review comments from DOE or other reviewers into a complete set of comments to be forwarded to the Facility Manager.

9. Conduct Review Meetings

A meeting involving the Laboratory review team, the Facility Manager and staff, and the SAR development team is recommended for each review phase to discuss the comments. DOE representatives should also attend the meeting, particularly if DOE conducted a review in parallel with the Laboratory's internal review. The primary objectives of the meeting are to ensure that the comments are understood and to agree to a path forward for resolving them. Meeting minutes will be taken to document agreements, requests, and open items.

The Facility Manager will distribute copies of each review package to the review team and to DOE at least two week in advance of the review meeting. The review meeting should be rescheduled if the package is not available approximately two weeks in advance. After the review team has completed their review, the review team leader will forward the team's comments to ESH-3. ESH-3 will compile the comments with any received from DOE or other reviewers and forward them to the Facility Manager in advance of the meeting. At the latest, all comments should be provided at the beginning of the meeting.

10. Resolve Comments

The Facility Manager and the SAR development team will resolve in writing all review comments designated as Essential. Using a standard comment form will facilitate comment resolution. For interim reviews, a commitment to incorporate a comment is sufficient to resolve the comment. Proposed resolutions will be documented, compiled, and forwarded by the Facility Manager to ESH-3. Interaction between the review team and the Facility staff or SAR development team should be arranged if necessary to resolve comments.

ESH-3 will distribute proposed comment resolutions to the Laboratory and DOE review teams. The Laboratory review team should verify that the proposed resolutions address the comments adequately. For interim reviews, proposed resolutions might simply be an agreement to add material. The review team will assess whether the added material is adequate during the next phase of the review.

11. Resolve Conflicts

Every attempt should be made to resolve review comments. The Facility Manager and review team leader should negotiate technical disagreements. Situations might occur, however, where a difference of technical opinion cannot be resolved. When such a situation arises, the Facility Manager should arrange a conflict resolution meeting with the ODD responsible for approving the SAR. The Facility Manager and the review team leader will present their position and the responsible manager will direct a path forward. A representative from ESH-3 will attend to represent the institutional position. The Facility Manager is responsible for coordinating the conflict resolution meeting and must bring such issues to closure expeditiously to avoid delays.

12. Review Team Concurrence

After all review comments from the 100% review phase have been resolved, the review team will document satisfactory completion of the review with a memorandum to the Laboratory manager responsible for approving the SAR. Any dissenting team member opinions will be submitted with this memorandum.

Table 1. Example Attributes of SAR Review Meetings

	Review Kick-off Meeting	30% Review	70% Review	90% Review
Expectations & Goals	- Team Orientation - Tour facility - Define review goals and expectations - Specification of team roles & responsibilities - Identification of external reviewers and observers - Review schedule & milestones - Outline of SAR Review Plan and assignments - Records Management and QA considerations - Security considerations	- Facility description including facility processes and major activities defined - Hazard analysis and accident analysis methodologies - Hazard identification, characterization, and evaluation - Risk ranking of postulated accident scenarios - Identification of candidate safety SSCs (SC and SS) - Identification of candidate accidents to be analyzed	- All content in 30% review package updated and with comments incorporated - Preliminary accident analysis - Safety functions and safety system descriptions per DOE-STD-3009-94, Ch. 4 for safety SSCs - Refined performance requirements identified through safety system evaluations - Criticality safety evaluations and controls identified - Preliminary set of TSRs (LCOs) and operational considerations for maintaining safety SSCs - Emergency management program described - Radiation and hazardous material protection programs described	Finalization of: - accident analysis - safety functions, safety system descriptions, functional and performance requirements, and system evaluations - derivation of technical safety requirements - institutional programmatic controls
Considerations	- Team Leader will have primary responsibility for developing SAR Review Plan w/team members providing input - Develop protocols for interfacing w/facility personnel and SAR development team.	- Arrange facility presentations and conduct facility walkthroughs	- Defense in depth strategies identified and evaluated - Verification of accident analysis computational code applicability and use	- All comments and safety issues have been completely resolved or vulnerabilities have been identified, compensated, and action items have been committed to for their resolution with a detailed schedule agreed upon by review team leader

3.5 Rules for Review Comments

This section provides basic rules for review comments for Laboratory SARs. Prior to submittal, all comments are to be reviewed by the review team leader (or a designated senior member of the review team). The purpose of this review is to ensure technical accuracy, compliance with the rules provided in this section, and integration with other related comments. Comments that do not comply with the rules provided below should be revised or screened out and not submitted.

Situations have occurred in the past where chapters or sections of a SAR are significantly deficient and require major rework. In these situations, developing detailed, specific comments is difficult and often not effective. It is usually better for the review to be suspended once it is determined that such deficiencies exist. The review team leader should then meet with the Facility Manager and SAR development team to discuss the deficiencies in general and request the subject chapters or sections be reworked.

SAR review comments should follow the following rules.

1. **Focus on significant deficiencies rather than marginal issues or minor discrepancies.** As stated in STD-1104, a significant deficiency identifies a problem or concern that affects the utility or validity of the SAR. Such issues are generally those involving: (1) hazardous material or energy release with significant consequences to the public, worker, or environment that will otherwise be left without coverage in the SAR; (2) technical errors that invalidate major conclusions relevant to the safety basis; or (3) failure to cover topical material required by DOE directives and guidance on safety basis documents. Do not focus on pet issues that are not central to the primary functions of the SAR.

2. **Comments must be based on a failure to adequately address a requirement in DOE Order 5480.23 (per DOE-STD-3009 guidance) or other applicable requirements document.** The comment should indicate how the deficient item does not comply with the applicable requirement or with Laboratory or DOE interpretations of applicable requirements. In addition, material must be presented clearly. Material that is confusing, illogical, not readable, internally inconsistent, or incomplete does not meet SAR standards and should be considered deficient.

3. **Comments should be specific.** Avoid general statements that do not clearly identify a deficiency. Personnel resolving the comment should not have to guess at a comment's intent. If material is significantly deficient in content or technical accuracy, the comment should be worded in a way that explains the deficiency. Comments should be "resolvable;" that is, there should be a clear path forward for resolution.

4. **Do not use the SAR review process to raise issues that are appropriate for another forum.** Examples include issues related to the programmatic mission of the facility or questions about DOE policy that are outside the scope of the SAR.

5. **Do not provide comments that deal with personal preferences.** There is always more than one way to present material or perform an analysis. Review comments must identify real deficiencies and should not promote a different or "better" way of doing something when there is no actual deficiency.

6. **Comments must not ask open-ended questions.** At times, material may be confusing or incomplete and its adequacy cannot be evaluated and specific comments cannot be posed.

Comments should be phrased as a statement of the problem (e.g., the material does not address a certain topic clearly), rather than as an open-ended question that is difficult to resolve.

7. **Comments should offer a resolution to the identified deficiency, if one is known.** Resolutions should be based on an applicable standard or requirements document**.**

8. **No "Essential" editorial comments.** Editorial errors and improvements identified by reviewers should be submitted as "Suggested" comments. The SAR development team should attempt to correct errors to improve the presentation of the material, but "Suggested" comments do not need to be tracked and do not require resolution. Comments that identify confusing or poorly written material that is impossible to follow or very difficult to understand are not editorial comments if the material is essential. These are deficiencies if the analysis, safety program, activity, etc., is not described adequately and cannot be evaluated.

9. **Review comments should not be submitted just because a reviewer does not have the basic information to determine whether a deficiency actually exists.** Comments should be based on knowledge of the facility and operations. Reviewers should obtain information through facility tours, interviews with facility personnel, and review of source documents. An active interface between the review team and the facility operating organization should be established to facilitate the flow of information to the review team.

10. **Comments should be worded in a professional manner and tone.** Personal insults, innuendo, and harsh remarks are not acceptable and should not be voiced in review comments. Comments should be worded in the spirit of contributing to the goal of producing a quality SAR. Comments should stick to the facts and be geared toward improving and enhancing the document rather than conveying a negative tenor or attempting "one upmanship." The SAR review process should not be used to advance personal or organizational agendas.

11. **Comments should not address material that was previously reviewed.** With a few exceptions, once material has been reviewed and commented on in an interim review, it should not be revisited in subsequent reviews. Reviewers are responsible for completing reviews of interim packages and should not consider later reviews an opportunity to "catch up." Previous material should be revisited if it has been revised, if other changes were made that affect the subject material, if new Laboratory requirements have been issued, if new DOE interpretations have been communicated, or for other similar developments. This problem sometime occurs when a reviewer is replaced between review phases. New reviewers should accept the conclusions of earlier reviews unless clear and significant deficiencies are discovered in previously reviewed material.

4.0 REVIEW CRITERIA

4.1 General Review Criteria

DOE-STD-1104 establishes five major subject areas for assessing SAR adequacy. These areas also comprise the approval bases for the DOE SER. The five areas and the associated primary SAR chapter(s) are as follows.

- Base information (Ch. 1 and 2 and parts of the Executive Summary)
- Hazard and accident analysis (Ch. 3)
- Safety structures, systems, and components (Ch. 4)

- Derivation of technical safety requirements (Ch. 5)
- Programmatic control (Ch. 6-17)

By defining these areas as the major subject areas for assessing SAR adequacy, Chapter 3, 4, and 5 are established as the central focus of the review effort. This perspective is expressed in several places in the standard. Reviews of the other chapters are necessary, but they should not consume an inordinate portion of review resources and focus.

The objective of the review of programmatic chapters is sometimes misunderstood. DOE-STD-1104 states that: "the acceptance of programmatic control does not constitute acceptance of the adequacy of program compliance with DOE directives. That can only be accomplished by detailed compliance reviews of each of the programs, which is beyond the scope and purpose of a SAR." The programmatic chapters are intended to provide a summary of existing programs with emphasis on programmatic control of the hazards as discussed in the hazard and accident analyses. The review should determine if the essential program elements are identified and briefly summarized, and if the program includes provisions that will provide adequate programmatic control of the hazards present. The review should not attempt to perform a detailed compliance assessment of the program.

General criteria for each of the five approval bases are as follows. (These are summaries from STD-1104; more detailed discussions can be found in the standard.)

Base Information. Determining the adequacy of base information generally entails being able to conclude that the SAR contains the sufficient documentation and basis to arrive at the following conclusions:

- The facility mission(s) and scope of operations for which safety basis approval is being sought are clearly stated and reflected in the type and scope of operations analyzed in the SAR.
- A description of the facility's life-cycle stage, mission(s), and operation(s) is presented, including explanation of the impact on the facility safety basis.
- Descriptions of site, facility, and operational processes provide a knowledgeable reviewer sufficient background material to understand the major elements of the safety analysis.
- Correlation is established between actual facility arrangements and operations with those stated in the SAR.

Hazard and Accident Analyses. Determining the adequacy of hazard and accident analyses generally entails being able to conclude that the SAR contains the sufficient documentation and basis to arrive at the following conclusions:

- The hazard analysis includes hazard identification that specifies or estimates the hazards relevant for SAR consideration in terms of type, quantity, and form, and also includes properly performed hazard classification.
- The hazard analysis includes evaluation that covers the activities for which approval is sought, is consistent in approach with established industrial methodologies, identifies preventive and mitigative features for the spectrum of events examined, and identifies dominant accident scenarios through ranking.
- The hazard analysis results are clearly characterized in terms of defense in depth, worker safety, and environmental protection. The logic behind assessing the results in terms of safety-significant SSCs and designation of TSRs is understandable and internally consistent.
- Subsequent accident analysis clearly substantiates the findings and delineations of hazard analysis for the subset of events examined and confirms their potential consequences.

STD-1104 indicates that these conclusions can typically be made without extensive independent calculations and analyses. The goal of the review is to ensure that the safety basis is comprehensive relative to the hazards presented and is based on a consistent, substantiated logic.

Safety Structures, Systems, and Components. Determining the adequacy of safety SSCs generally entails being able to conclude that the SAR contains sufficient documentation and basis to arrive at the following conclusions:

- The safety SSCs identified and described are consistent with the logic presented in the hazard and accident analyses.
- Safety functions for safety SSCs are defined with clarity and are consistent with the bases derived in the hazard and accident analyses.
- Functional requirements and system evaluations are derived from the safety functions and provide evidence that the safety functions can be performed.
- Control of safety SSCs relevant to TSR development are clearly identified.

Derivation of Technical Safety Requirements. Determining the adequacy of the derivation of TSRs generally entails being able to conclude that the SAR contains sufficient documentation and basis to arrive at the following conclusions:

- The bases for deriving TSRs that are identified and described in the hazard and accident analyses and safety SSC chapters are consistent with the logic and assumptions presented in the analyses.
- Bases for deriving safety limits, limiting control settings, limiting conditions for operation, surveillance requirements, and administrative controls are provided as appropriate.

Programmatic Control. Programmatic control encompasses the elements of institutional programs and facility management that are necessary to ensure safe operations based on assumptions made in the hazard and accident analyses. Determining the adequacy of programmatic control generally entails being able to conclude that the SAR contains sufficient documentation and basis to arrive at the following conclusions:

- The major programs needed to provide programmatic safety management are identified.
- Basic provisions of identified programs are noted, and references to facility or site program documentation are provided.

4.2 Introduction to Review Checklists

Use of checklists is standard practice for most audits, assessments, readiness reviews, etc., but formal checklists are usually not used for SAR reviews. Rather, subject matter experts typically rely on their knowledge of requirements to assess the adequacy of the material, or they work directly from STD-3009. Sometime a review plan is developed with general criteria. Although a satisfactory review can be accomplished using these methods, the use of formal checklists has several advantages and usually results in a more effective review. The checklists in this section are provided as a starting point to help organize and focus SAR reviews. Their use is optional, but use of some type of checklist (or equivalent) is strongly recommended.

These checklists were developed from DOE-STD-3009 (for the SAR chapters) and DOE Order 5480.22 (for the TSR sections). The checklists contain questions that cover the most essential elements of each chapter or section. The intent was to identify these most essential elements to assist in focusing

reviews on the most important issues. Unstructured reviews, especially those conducted by inexperienced personnel, frequently focus on secondary or peripheral issues and not the central SAR issues. So one advantage of using these checklists is to keep the review appropriately focused.

A second advantage to using the checklists is that they can serve as a check on completeness. Even experienced reviewers can benefit by a reminder of important issues to evaluate during the review. Another value of using checklists is that the format contains space to enter comments alongside the associated question, which provides direct correlation of deficiencies with the associated requirement. Using this format would help to control comments to ensure that they identify deficient conditions, and would also serve as a useful reference to the applicable requirement. Finally, completed checklists can be compiled and serve as a record of the review.

The checklists in Sec. 4.3 contain general requirements for SARs and TSRs. Some material must be reviewed to more detailed or specific criteria to assess adequacy. These checklists can be tailored as necessary (i.e., items can be added, modified, or deleted) for a particular review effort.

4.3 Review Checklists

Following are checklists that cover a full scope SAR prepared in accordance with the format and content guidance of DOE-STD-3009 and a full scope TSR prepared in accordance with DOE Order 5480.22. The checklists are generally formatted one checklist per chapter, but some major SAR chapters are addressed by multiple checklists. In addition, the hazard analysis/accident analysis checklist has associated text that provides further guidance. (These additional instructions are located after all the checklists.)

Checklists should be applied with appropriate consideration of the general criteria discussed above in Sec. 4.1. For example, the depth of review for Chapter 3 should be substantially greater than that for the programmatic chapters. It would not be unusual for the review of Chapter 3 to use more resources than the reviews for Chapters 6 through 17 combined. The checklists are potentially misleading if only the numbers of questions are considered. Some questions for Chapter 3 will require extensive evaluation.

A generic programmatic chapter checklist precedes the checklists for Chapters 6 to 17. This generic checklist includes questions that apply to each of these chapters and should be used in together with each individual chapter checklist. Each individual chapter checklist in essence provides the details necessary to answer the first question on the generic checklist (“Are all the topics of DOE-STD-3009 addressed?”).

SAR/TSR Review Checklist
Los Alamos National Laboratory

Facility: Reviewer(s):
Document Draft/Rev/Date:
Date:

Chapter 1, Site Characteristics

Question	Yes	No	Comments
1. Is the description of the location of the site, location of the facility within the site, its proximity to the public and to other facilities, and identification of the point where EGs are applied (i.e., location of MOI) clearly identified?			
2. Is the description of population sheltering, population location and density, and other aspects of the surrounding area to the site that relate to assessment of the protection of the health and safety of the public clearly identified?			
3. Is the description of the historical basis for site characteristics in meteorology, hydrology, geology, seismology, volcanology, and other natural phenomena to the extent needed for hazard and accident analyses provided?			
4. Have design basis or evaluation basis natural phenomena criteria been identified based upon proven and accepted methods?			
5. Have sources of external accidents, such as nearby airports, railroads, or utilities such as natural gas lines been clearly identified?			
6. Have nearby facilities impacting, or impacted by, the facility under evaluation been identified?			
7. Have site characteristic assumptions common to safety analysis that were used in prior environmental analyses and impact statements (if available), or of the need to revise and update such assumptions used in facility environmental impact statements been identified or revised?			

SAR/TSR Review Checklist
Los Alamos National Laboratory

Facility: Reviewer(s):
Document Draft/Rev/Date:
Date:

Chapter 2, Facility Description

Question	Yes	No	Comments
1. Does the facility overview include a clear discussion of facility inputs, outputs, mission, and history?			
2. Is a description of the facility structure and design basis or evaluation basis provided?			
3. Is a description of the facility process systems and constituent components, instrumentation, controls, operating parameters, and relationships of SSCs provided?			
4. Is a description of facility confinement systems provided?			
5. Is a description of the facility safety support systems provided?			
6. Is a description of the facility utilities provided?			
7. Is a description of facility auxiliary systems and support facilities provided?			

SAR/TSR Review Checklist
Los Alamos National Laboratory

Facility: Reviewer(s):
Document Draft/Rev/Date:
Date:

Hazard Identification (Ch. 3)

Question	Yes	No	Comments
1. Is a summary table provided that systematically identifies hazards by type, quantity, form, and location? [Note: if classification issues preclude such specification in the main document, a classified appendix must be provided.]			
2. Do the hazards and quantities identified cover all operations described in Ch. 2, *Facility Description*?			
3. Are the hazards and quantities identified consistent with statements and assumptions made in the hazard and accident analysis detailed throughout Ch. 3?			
4. Are the quantities specified derived from credible bases (e.g., flowsheets, historical data, operational limits) in a reasonably conservative manner?			
5. Is the hazard category assigned for the hazards identified consistent with the methodology of DOE-STD-1027-92?			

Note: Additional instructions are provided for this checklist.

SAR/TSR Review Checklist
Los Alamos National Laboratory

Facility: Reviewer(s):
Document Draft/Rev/Date:
Date:

Hazard Evaluation (Ch. 3)

Question	Yes	No	Comments
1. Is the hazard evaluation methodology (1) stated explicitly, (2) consistent with the analysis methods referenced in DOE-STD-3009, and (3) reasonably tailored to the type and complexity of operations examined?			
2. Were facility operating personnel involved in the evaluation?			
3. Was available information used and for the analysis (e.g., procedures, process and equipment descriptions, flowcharts) consistent with that reasonably available from the facility?			
4. Where holes existed in available information, was supporting information generated (e.g., summary descriptions, drawings, and flowcharts) sufficient to provide basic understanding of significant operations, key parameters, and controls?			
5. Is a complete set of hazard evaluation worksheets/tables available to inspect? [Note that completeness requires the following columns for each entry: a specific hazard; the accident type and cause; all associated preventive and mitigative controls; consequence and likelihood ranking estimates; and a field for comments or recommended action items.]			
6. Do the cumulative hazard evaluation worksheets address every significant hazard identified in the hazard identification summary table as well as each operation/activity described in Ch. 2, *Facility Description*?			
7. Do any of the required worksheet entry columns appear to have been treated superficially (i.e., vague hazard or causes, generic or incomplete control listing, no comments or recommended action items)?			

Question	Yes	No	Comments
8. Are the bases for consequence and likelihood binning at least qualitatively defined?			
9. Is the scenario binning technique functional and applied consistently throughout the evaluation? [Note that the binning must clearly distinguish the largest consequence events to identify unique and representative scenarios for accident selection. Dismissal of physically plausible internally initiated events due to risk or mitigated consequence criteria is inappropriate.]			
10. Are there any additional significant aspects of facility operations known to the reviewer(s), or noted in facility walkthroughs, that the hazard evaluation fails to cover?			

Note: Additional instructions are provided for this checklist.

SAR/TSR Review Checklist
Los Alamos National Laboratory

Facility: Reviewer(s):
Document Draft/Rev/Date:
Date:

Hazard Analysis Results (Ch. 3)

Question	Yes	No	Comments
Planned Design and Operational Safety Improvements			
1. Is there evidence, documented in the SAR or separately, that the hazard analysis generated action items and recommendations that were assessed by facility and operations management?			
2. Where issues require further study, a significant concern cannot be fully addressed at present, or major upgrades are planned, have appropriate interim operational control commitments been made?			
Defense in Depth/Worker Safety			
3. Is the information captured in the hazard analysis adequately summarized to define overall safety principles (defense in depth) and major principles of worker protection (worker safety) for a given facility or operation?			
4. Is the identification of major controls in these sections consistent with those identified in the hazard evaluation worksheets?			
5. Does the SAR documentation in these sections demonstrate a coherent thought process leading to the selection of safety significant SSC and TSR commitments?			
6. Based on the content of these two sections, are the set of safety SSC designations and associated TSR commitments considered adequate?			
Environmental Protection			
7. Are all major pathways for environmental insult identified?			

Question	Yes	No	Comments
8. Do the defense in depth measures identified provide reasonable and prudent prevention and mitigation for potential environmental releases?			
Accident Selection			
9. Is the accident selection consistent with the hazard evaluation, its definitions of defense in depth and worker safety, and the associated scenario binning?			
10. Is the selection of internally initiated accidents for accident analysis based on consequence? [Note that dismissing such events based on risk arguments related to controls is inappropriate.]			
11. Is the selection of natural phenomena and externally initiated events in accordance with DOE standards? [Note that initiator frequency is used to define natural phenomena events.]			
12. Do the accidents selected include all unique and representative accidents that could exceed Evaluation Guidelines and be subject to unique controls?			

Note: Additional instructions are provided for this checklist.

SAR/TSR Review Checklist
Los Alamos National Laboratory

Facility: Reviewer(s):
Document Draft/Rev/Date:
Date:

Accident Analysis (Ch. 3)

Question	Yes	No	Comments
Analysis Methods			
1. In each accident scenario, is a basis explicitly identified for all major parameter values (e.g., values for the five-factor formula defined in DOE-HDBK-3010-94)?			
2. Is a basis explicitly identified for all major meteorological dispersion parameters?			
3. Are the general principles or references used for accident modeling, including any computer codes used, identified with sufficient amplifying information to clarify the bases for input and calculation?			
Scenario Development			
4. Is each scenario described in a clear, linear sequence (i.e., detailed step-by-step explanatory text linked to any fault/event trees used)?			
5. Are the functions of preventive and mitigative features associated with each scenario clearly explained?			
6. Is documentation needed to support scenario description (e.g., seismic damage) presented, either in detail or as summary of a cited reference?			
7. Is each complete scenario consistent with the hazard analysis and the rest of the SAR, and does it accurately reflect the findings of separate studies referenced?			
Calculations			

Question	Yes	No	Comments
8. Are the parameters used for calculation (1) supported by technical references and/or reasonable experience from relevant and reliable sources, and (2) credible in the context of each overall scenario?			
9. Considered as a sum total, do the parameters used give confidence of a reasonably conservative answer?			
10. Is each final source term clearly specified?			
11. For each scenario, are unmitigated consequences clearly identified and directly compared with Evaluation Guidelines to determine if a need for safety class SSC designation exists?			
Safety Class Assessment			
12. Does each scenario whose unmitigated consequences exceed EGs document a coherent thought process for the selection of safety-class SSCs from a candidate pool, as well as any additional TSR commitments?			
13. Does review of the basis for safety class designation indicate that all appropriate designations and associated TSR commitments have been made?			

Note: Additional instructions are provided for this checklist.

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Chapter 4, Safety Structures, Systems, and Components

Question	Yes	No	Comments
1. Is the following information provided in a summary presentation: (1) identification of safety class and safety significant SSCs; (2) bases for identifying safety SSCs (i.e., accident upon which the safety SSC is needed for); (3) safety functions; (4) functional requirements; (5) performance requirements; and (6) provisions for requiring TSR coverage?			
2. Is each safety-class SSC and each safety-significant SSC designated in Ch. 3 covered in Ch. 4?			
3. For each safety SSC, is a clear and concise description of the safety function provided, including identification of specific accidents that the safety SSC prevents or mitigates?			
4. For each safety SSC, is a detailed description provided that specifies the basic principles by which it performs its safety function?			
5. For each safety SSC, is a description of its boundaries and interface points with other SSCs relevant to its safety function discussed?			
6. For each safety SSC, is a clear discussion of failure modes and those actions needed to prevent failure provided?			
7. For each safety SSC, are functional requirements clearly and concisely provided (i.e., limited to those requirements necessary for the safety function)?			
8. For each safety SSC, do the functional requirements specifically address the pertinent response parameters or non-ambient environmental stresses related to each specific accident that the SSC has a safety function?			

Question	Yes	No	Comments
9. For each safety SSC, are performance criteria necessary for the SSC to meet its functional requirements identified, and are they clearly based on accident analysis parameters or assumptions?			
10. For those cases where the design basis of a safety-class SSC is not known, has comparison against traditional design criteria (e.g., single failure) been performed? (Not applicable to safety-significant SSCs.)			
11. For each safety SSC identified, have potential TSRs needed to ensure the safety function of the SSC been identified?			

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Chapter 5, Derivation of Technical Safety Requirements

Question	Yes	No	Comments
1. Are codes, standards, regulation, and DOE orders listed relevant specifically to establishing TSR controls, and LANL's work smart standards commitment?			
2. Is each control identified in Ch. 3 and 4 for TSR coverage discussed in Ch. 5?			
3. Is the following information provided in a summary presentation: (1) relevant hazards; (2) major features relied on for protection against each hazard; and (3) the associated TSR coverage in terms of SLs, LCOs, SRs, ACs, and/or design feature designation?			
4. Are the basic operational modes established in a way that the status of safety systems can be distinctly defined?			
5. Are the criteria for selecting SLs, LCSs, and LCOs described and are they adequate (e.g., quantitative criteria based on off-site Evaluation Guidelines)?			
6. Are controls for auxiliary systems needed to support safety systems identified and included in the TSR?			
7. Where necessary, are important assumptions or parameters used in the hazard analysis or accident analysis identified for establishing SRs and operability?			
8. Where necessary, are vendors' specifications identified for establishing SRs?			

Question	Yes	No	Comments
9. Are all ACs identified in Ch. 3 as requiring TSR coverage discussed in Ch. 5?			
10. Are ACs covering safety management programs tailored for the specific facility or activity?			
11. Does the Design Features section identify and briefly describe the passive design features not specifically required to have TSRs?			
12. Are TSRs from other facilities that can affect this facility's operations identified and summarized?			

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Generic Programmatic Chapter Checklist
(To be used with each Ch. 6 to Ch. 17 checklist) **This Sheet for Ch. _____**

Question	Yes	No	Comments
1. Are all the topics of DOE-STD-3009 addressed? (This is intended as an overall assessment of completeness. The individual chapter checklists address each required topic in more detail.)			
2. If a major topic specified in STD-3009 is not covered due to application of the graded approach, is this discussed?			
3. Are the applicable codes and standards identified? Are the applicable LANL Work Smart Standards included?			
4. Do the descriptions of the major program elements reference the existing supporting documentation (i.e., LANL program LIR and/or facility plan)?			
5. Do the descriptions of the major program elements include brief abstracts of referenced documentation with enough of the salient facts to provide an understanding of the referenced documentation and its relation to this chapter? (A "brief abstract" –STD-3009 words– should be at least one or two paragraphs that describe the program element.)			
6. Do the program descriptions include the administrative controls identified in the Ch. 3 hazard analysis?			
7. Are cross-references to material in other chapters accurate and is the referenced material adequate to address the subject of the chapter under review?			

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Chapter 6, Prevention of Inadvertent Criticality
(Not applicable to Hazard Category 3 facilities)

Question	Yes	No	Comments
1. Are fissile materials identified and their locations noted? Are potential criticality hazards identified? Do these hazards correspond with Ch. 3 identification?			
2. Are criticality controls summarized? Do these provide a basis for design limits and criteria to ensure criticality safety under normal, abnormal and accident conditions?			
3. Are engineering controls and their design basis and limits identified? Are these controls applicable to normal, abnormal, and accident conditions?			
4. Are administrative controls summarized? Do administrative controls include procedures for handling, storing, and transporting fissile material?			
5. Is the application of the double contingency principle discussed?			
6. Are SSCs identified for criticality safety and parameters needed for TSR control identified and referenced to the appropriate sections of Ch 3, 4, and 5?			
7. Is the criticality safety organization identified and described including staffing levels, positions of authority and responsibility, and staff qualifications? (This should address both the institutional organization and the facility element.)			
8. Are criticality safety procedures summarized?			

Question	Yes	No	Comments
9. Is the training provided to workers for criticality safety described to include facility and activity specific training? Does the discussion address the training for the configuration of equipment used to handle, transport, store, and process fissile material? (Ch. 12 may be referenced, if appropriate.)			
10. Are the analytical approaches used to determine criticality limits identified (codes, methods, and analysis techniques)? Are the approaches selected justified and appropriate?			
11. Are the relationships between operational criticality limits and their TSR designations defined? Is this consistent with discussions in Ch. 5?			
12. Are the criticality safety inspections and audits described? Are the responsibilities, authorizations, and the criteria used to select items, functions, etc., included? Is record keeping described?			
13. Is the criticality infraction program described including discussion of the provisions for infraction recovery? Is there a process for lessons-learned incorporation?			
14. Are the criticality instrumentation and alarm systems used to detect and mitigate criticality events summarized? Are the methods and procedures used to place equipment described?			

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Chapter 7, Radiation Protection

Question	Yes	No	Comments
1. Is the radiation protection program and its organization described?			
2. Is the ALARA policy and program applicable to the facility described?			
3. Is radiological protection training discussed including that for general employees, radiation workers, radiation protection technicians, supervisors, and mangers involved in operations or maintenance for which radiation protection is required?			
4. Are administrative limits established and identified for radiation exposure?			
5. Are radiological practices for exposure control summarized and directly associated with radiological activities?			
6. Are generic precautions summarized? Are specific plans and procedures for posting, labeling, and signifying boundaries for facility areas summarized? Is radiological work control discussed?			
7. Is the basis and content of the dosimetry program discussed including the basis for various types of dosimeters selected?			
8. Is the plan and procedures for respiratory protection discussed? Is the use of respirators for normal, abnormal and accident situations discussed?			

Question	Yes	No	Comments
9. Is the radiological program for material sampling and monitoring discussed? Does it address overall facility monitoring for contamination control, operational worker monitoring, and sampling for detection of airborne releases as appropriate?			
10. Is radiological protection instrumentation discussed? Does this discussion include the type of instrumentation used? Are plans and procedures for the selection and placement of instrumentation discussed? Is calibration addressed? If Ch 2, 5, 10, and 14 are referenced, is the information therein consistent and applicable?			
11. Are the procedures for radiological protection record keeping summarized and consistent with Laboratory requirements?			
12. Are the predicted annual exposures for workers summarized? If new operations are addressed, is the exposure estimated and is a basis provided? Are the measured, predicted, and annual radiological exposure limits listed and compared with discrepancies addressed?			

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Chapter 8, Hazardous Material Protection

Question	Yes	No	Comments
1. Is the hazardous materials protection program and its organization discussed?			
2. Is the ALARA policy and program discussed to a level consistent with the hazardous materials in the facility?			
3. Are hazardous materials training requirements discussed for workers, supervisors, and mangers whose work involves hazardous materials, protection, or training?			
4. Is the program to identify hazardous materials described? Dose the program include evaluation of material hazards and interface with relevant Laboratory programs and requirements?			
5. Are administrative limits including control levels and exposure times identified and summarized?			
6. Is the occupational medicine program summarized? Are applicable elements of the Laboratory's program identified?			
7. Is the respiratory protection program summarized to include the types of equipment used during normal, abnormal, and accident conditions? Are testing, inspection, and other applicable elements of the program identified?			
8. Is the hazardous material monitoring program and its relation to the Laboratory programs summarized?			
9. Are hazardous material instrumentation requirements identified? Is the program associated with this instrumentation and its use summarized?			

Question	Yes	No	Comments
10. Are plans and procedures for the documentation and maintenance of the documentation for hazardous materials described?			
11. Is the hazardous materials communication program described?			
12. Are the operational predicted annual exposures to workers summarized? If applicable is this based on historical records? If a new operation, are estimates and their bases provided? Are predicted, actual, and limiting exposures compared and discrepancies discussed?			

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Chapter 9, Radioactive and Hazardous Waste Management

Question	Yes	No	Comments
1. Is the radioactive and hazardous waste management program and organization described? Are interfaces between facility and Laboratory elements clearly defined? (If necessary, refer to Ch 17 for this information.)			
2. Are the solid, liquid, and gaseous waste streams and sources, including estimates of inventories, summarized?			
3. Are waste management and handling processes or treatment systems identified for radioactive, mixed, and hazardous waste?			
4. Are descriptions and summaries consistent with hazards identified in Ch 3 and processes described in Ch 2?			
5. Are the waste management process described and the overall plan summarized?			
6. Are the administrative and operational practices important to the effective management of each waste type summarized?			
7. Are there a summary of how and where each waste stream is generated and how each enters the appropriate waste management process?			
8. Are emission limits and permits applicable to the waste streams discussed?			
9. Are the processes used to treat different waste types and forms summarized? Does the summary include system function, basis physical or chemical principles, and flow diagrams?			

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Chapter 10, Initial testing, In-service Surveillance, and Maintenance

Question	Yes	No	Comments
1. Is the initial testing program summarized including that required for a facility modification?			
2. Is the in-service surveillance program summarized to include provisions for testing and calibration, control and calibration of test equipment, trending of results, programmatic review and training for personnel performing Surveillances?			
3. Is the maintenance program summarized?			
4. Does the program description include all important elements, including the organization, personnel training, and other aspects of the maintenance program?			

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Chapter 11, Operational Safety

Question	Yes	No	Comments
1. Is the conduct of operations program summarized? Does the program address the elements of DOE Order 5480.19 as implemented through LANL requirements?			
2. Are the fire hazards identified and discussed in terms of realistic magnitudes, fire hazards, and explosive loading in proximity to hazardous material being protected? Is this information consistent with similar information in Ch. 3?			
3. Are the results of facility fire assessments, such as Fire Hazard Analyses, and actual facility walk-downs discussed? Do these summaries put the fire hazards into proper prospective and relate the important fire characteristics of concern?			
4. Is the fire protection program summarized including fire management policies and philosophies as the basis for the program?			
5. If applicable, are descriptions of organization consistent with that in Ch. 17?			
6. Is the program to prevent unnecessary accumulation of combustibles (combustible loading) summarized to include the basis for the program? (The description should be consistent with any description in Ch. 3 or 5.)			
7. Is the fire fighting equipment, personnel, training, response procedures, etc., summarized or referenced?			
8. Is the fire prevention inspection program summarized including scheduling, discrepancy resolution, types and frequency of drills, and record keeping requirements?			

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Chapter 12, Procedures and Training

Question	Yes	No	Comments
1. Is there a summary of how procedures are selected for development? Is there a description of how procedures are verified as technically correct, verified, and validated for normal, abnormal, and emergency operations, and for surveillance testing and maintenance?			
2. Is there a summary of the provisions for documenting and controlling procedures including introduction of new procedures and changes in human-machine interfaces covered by procedures?			
3. Is the process used to determine, develop, verify, and validate the technical content of training summarized? Are the subtopics in Section 12.4.1 of DOE Std 3009-94 addressed?			
4. Are the provisions to ensure that training reflects the actual facility conditions summarized to include the introduction of new equipment and the reflection of current and modified procedures?			
5. Are training records maintained and is that process discussed?			
6. Is there a summary of how training materials are modified to accommodate technical or human-factors deficiencies in the training program?			

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Chapter 13, Human Factors

Question	Yes	No	Comments
1. Is the process for systematically evaluating the importance of human factors in facility safety summarized?			
2. Are the safety SSCs requiring human-machine interfaces to function identified? Do safety SSCs identified in Ch. 3 and 4 have requirements for supporting human-factors for surveillance and maintenance during normal operations? Are human factors interfaces for proper operation during normal, abnormal, and emergency operation modes identified? Are human actions defined so that it is understandable what the human must do and the relative importance of the human action identified?			
3. Are the measures used to perform a systematic inquiry into the human-factors interfaces with safety SSCs summarized to include the use of checklists for inquiry documentation? Is the discussion proportionate to the SSCs safety importance and address the design items in Section 13.5 of DOE Std 3009-94?			
4. If documentation found elsewhere in the SAR is referenced, is it appropriate to the discussion?			

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Chapter 14, Quality Assurance

Question	Yes	No	Comments
1. Is the quality assurance organization and program summarized to include the policies and philosophies that are the basis for the program?			
2. Is the organization structure of the quality assurance organization identified including staffing levels, qualifications, positions of authority and responsibilities, interfaces with other safety organizations? If referenced in Ch 17 in whole or part, review Ch 17 for accuracy and completeness for the quality assurance organization.			
3. Are the programs, processes, and procedures used for quality improvement summarized to include those used for correcting adverse conditions that affect quality such as the identification and control of nonconforming materials, parts, and components?			
4. Is the document and record control management program described as it is associated with quality assurance?			
5. Is the work controls process(s) described that ensure work is performed under controlled conditions?			
6. Is the process used to ensue quality assurance is integrated into design summarized?			
7. Is the process used to integrate quality assurance into procurement described? Is it described how prospective suppliers are evaluated, selected, and their acceptability monitored?			
8. Is the process used to integrate quality assurance into testing and inspection described?			

Question	Yes	No	Comments
9. Is the process for internal independent assessment and external verifications and audits of the quality assurance program described?			

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Chapter 15, Emergency Preparedness Program

Question	Yes	No	Comments
1. Is the spectrum of emergencies that the emergency preparedness program is expected to respond to identified and summarized? Is this spectrum consistent with the hazards identified and analyzed in Ch 3?			
2. Is the emergency response organization summarized including authorities of key individuals and groups? Is the communications chain defined for notifying, alerting, and mobilizing necessary personnel? Is the position of the person with overall authority identified? If this information is contained or referenced to Ch 17 is that information consistent and complete?			
3. Is the process by which the onset of an operational emergency is recognized summarized? Are methods used to obtain meteorological data and estimate source terms described including specifics of type of code, if such is used?			
4. Is the provision for prompt notification of emergency response personnel identified and summarized? Are notification methodologies for DOE, federal, state, county, tribal, and other non-Laboratory organizations defined? Is the follow-up notification process for public information integrated into the emergency response program?			
5. Are pertinent aspects of emergency facilities and equipment required to support the emergency response program identified and summarized?			
6. Are protective actions necessary to minimize the exposure to the public and workers summarized? Is medical and decontamination support discussed? Are important elements of evacuation plans summarized including times, routs, and methods of alerting?			

Question	Yes	No	Comments
7. Is the emergency response training program described to include initial and annual refresher training for all emergency response personnel? Are the drills and exercises that are part of the emergency response program summarized and is the range of different populations exposed to facility hazards identified? If Ch 12 is referenced, is that information supportive and accurate?			
8. Are the provisions for recovery from an operational emergency and planned reentry provisions for the facility discussed? Is the planned transition from emergency response to recovery organizations discussed?			

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Chapter 16, Provisions for Decontamination and Decommissioning

Question	Yes	No	Comments
1. Is the conceptual plan for D&D summarized? Does the plan summary address design features to minimize the potential for spread of contamination? Is the content of Section 16.3 of DOE Std 3009-94 addressed?			

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Chapter 17, Organization, and Institutional Safety Provisions

Question	Yes	No	Comments
1. Is the facility organization summarized to include interfaces with respect to the management of the facility beyond the operating organization?			
2. Are organizational responsibilities and authorities summarized? Are organizational interfaces summarized in this chapter or referenced to other programmatic chapters? Are all the topics in section 17.3.2 of DOE Std 3009-94 discussed?			
3. Are the bases for staffing levels and skills, knowledge, and abilities of personnel in identified organizations discussed? Are the programs and provisions for monitoring safety performance of this staff described?			
4. Is the program and procedures used to ensure independent oversight, safety review, USQ determination, and appraisal of the safety performance of the organization summarized?			
5. Is the configuration and document control program discussed including those related to facility modification, control of safety related functions such as as-built drawings, operating procedures, training manuals, etc.?			
6. Is the occurrence reporting program discussed and summarized including the provisions for reporting, information analysis, evaluation of operating experience and trends, and development of feedback, corrective actions, and lessons learned?			
7. Are the policies and programs used to promote an interest and involvement of workers in facility safety, facility a questioning attitude toward safety, and ensure workers understand risks to them and their coworkers described? Are methods used to promote and maintain a safety culture discussed?			

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TSRs – Sections 1 and 2

Question	Yes	No	Comments
1. Does Sec. 1 include a list defined terms that contains the terms used in the TSR document that require clarification of the intent of their use?			
2. Are the definitions clear, and are they consistent with standard usage and with the intended use of the terms?			
3. Does Sec. 1 define the operating modes of the facility clearly in terms of operational conditions? Is there an adequate explanation of the use and application of operating modes?			
4. Does Sec. 1 include the standard use and application explanations for the following TSR devices: - Logical Connectors - Completion Time - Frequency Notation - Safety Limits - Limiting Control Settings - Limiting Conditions for Operation - Surveillance Requirements Note: Standard use and application explanations are specified in DOE Order 5480.22 and the Defense Programs *Document of Example Technical Safety Requirements, Volume 1: Examples*, November 1993. Explanations may include minor variations to account for unique facility conditions.			

Question	Yes	No	Comments
5. Are the safety limits included in Sec. 2 consistent with the safety limits established in the SAR? If no safety limits are required does Sec. 2 so state? Note: No LANL nuclear facilities currently have safety limits, so no detailed review criteria are specified here. If this review checklist is ever used for a TSR that includes safety limits, review criteria will have to be established by the reviewers.			

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TSRs – Section 3, LCOs

Question	Yes	No	Comments
1. Do the LCOs identified in the TSR agree with those identified in Ch. 3 and 5?			
2. Are the operability requirements for each of the SSCs covered by LCOs been clearly identified? Are they unambiguous, concise, so as to not lead to misinterpretation? (LCOs that simply state that the SSC has to be operable are not acceptable).			
3. Is the mode applicability adequate for each of the LCOs?			
4. Is the facility or activity applicability adequate for each of the LCOs?			
5. Do the LCO conditions agree with each of the LCO requirements?			
6. Are the remedial actions adequate for the conditions, that is do they become more conservative (safer condition) as they are implemented?			
7. Does each of the remedial actions have completion times, and are they adequate to allow implementation and ensure safety?			
8. Are there bases for each of the LCOs, the mode applicability, remedial actions, and their completion times?			
9. Are these bases adequate to support the LCOs (they should not be a regurgitation of the LCOs themselves)?			

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TSRs – Section 4, Surveillances

Questions	Yes	No	Comments
1. Is there at least a one-to-one correspondence between LCOs requirements and SRs? That is, at least one SR per LCO requirement.			
2. Are the SRs explicit enough to ensure the LCOs' requirements are met?			
3. Does each of the SRs have a completion time?			
4. Is each of the completion times adequate to ensure the operability of the safety SSC covered by the LCO?			
5. Does the bases provide enough information to support the SRs and their completion times?			

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TSRs – Section 5, Administrative Controls

Question	Yes	No	Comment
1. Is Conduct of Operations as implemented at the Laboratory included?			
2. Is there a commitment to the appropriate Quality Assurance program?			
3. Are minimum staffing requirements addressed? Are staffing requirements by mode or operation addressed (this should be covered if the analysis relies on staffing as a safety factor)? (Ref DOE O 5480.22, Attachment 1, II.2.4.e.(3))			
4. Is there a specific commitment to personnel qualification and training? Does this commitment identify the program or requirement that will govern qualification and training? Is the commitment consistent with information found in the SAR, particularly Ch 12 and 14? (Ref DOE O 5480.22, Attachment 1, II.2.4.g)			
5. Is a program for conduct of in-service inspection and testing committed to and is it consistent with the commitments in Ch 10? (Ref DOE O 5480.22, Attachment 1, II.2.4.d)			
6. Is there a commitment to configuration control? If the configuration control program is approved by DOE it may be included by reference (see Ch 17 for supporting commitments)? If the program is not approved by DOE, then the process must be described and committed to with reference to applicable standards. (Ref DOE O 5480.22, Attachment I, II,2.4.d) Note: Configuration control for non-facility nuclear operations must be considered on a case-by-case condition.			

Question	Yes	No	Comment
7. If criticality safety is applicable, is there a commitment to criticality safety including the physical and administrative controls essential for the program. Is the criticality control program briefly described. Is the description consistent with Ch 6 of the SAR? (Ref DOE O 5480.22, 9.e.5)			
8. Are material inventory controls addressed in the administrative controls section. (Note: In some cases an LCO might cover some aspects of this control.) Are all materials requiring control to satisfy basic accident assumptions, categorization limits, regulatory limits, etc., that are necessary to remain within the hazard category identified (typically fissile and radioactive, toxic, explosive, etc.). Do material controls identify where the limits apply (total facility, wing, operation, etc.? Do material limits address how the limits will be controlled?			
9. Does fire protection need to be addressed. Fire protection elements that are important to identified accident control should be included in an administrative control. Fire detection and suppression equipment may be included in the administrative control as an element of the overall fire protection program. LCOs may also exist for selected elements of the fire protection system. At LANL, many facilities rely upon a combustible loading program. If the combustibles loading program is credited as important in accident or hazard analyses, then the program should be committed to. The combustibles loading program should address loading limits (transitory and fixed) as well as the method used to maintain the limits. Commitment to the appropriate NFPA standards adopted by the Laboratory should be noted if critical to the safety function of the fire protection program and should be consistent with the discussions in the SAR.			
10. If the requirements of 29 CFR 119.119 are applicable, then the TSR administrative controls should contain a commitment to process safety management. The administrative control should identify how requirements are met and reference the program established to satisfy the requirements.			
11. Are radiological effluent control and ventilation filter testing addressed? These may be addressed through administrative controls if they are necessary for worker protection or are used to limit radiological materiel releases. If included, then the			

Question	Yes	No	Comment
applicable programs, facility areas, mechanical systems, testing programs, sampling, monitoring systems, and standards should be identified or referenced.			
12. Is radiological protection addressed? Radiological protection should be included if this program is credited as a significant protection element for the nuclear facility. Provide a list of the major elements associated with the program such as sampling, dosimeter, training, PPE, control areas and zones, etc. Reference applicable Laboratory LIRs and facility programs.			
13. Is emergency planning addressed? Emergency planning should be included in the administrative controls. Is there a specific commitment to an emergency plan and is this commitment consistent with the emergency planning SAR programmatic discussion?			
14. Are explosive gas or toxic substances monitoring programs addressed? If these programs are relied upon in the hazard or accident analysis, the programs should be committed to and referenced in the administrative controls. The discussion in the TSR should be consistent with the discussion of the same topics in the programmatic discussions in the SAR.			
15. Are facility radiation monitoring and storage tank radiation monitoring addressed? If these elements are important to the safe operation of the facility based on the hazards or accident analyses then an administrative control committing to these programs should be included. These may be included in the radiation protection program. The administrative control should include physical facility areas involved, radioactive substances monitored, monitoring equipment and their locations, applicable standards, and any associated limits. These discussions should be consistent with the description of radiation protection provided in the SAR.			
16. If environmental measurement and control is relied upon to protect the workers or the environment, then an administrative control committing to the program or processes should be included in the TSR. If included, a brief description of the program, related equipment, monitored substances, and controls should be provided. Corresponding programmatic and facility descriptions in the SAR should be consistent.			

Question	Yes	No	Comment
17. Other safety programs committed to in the SAR and relied upon for worker or public safety in the hazard and accident analysis should be included. Descriptions or programs, equipment, and controls should be consistent with the SAR.			
18. Are facility procedures addressed? The system that governs the production, review, control, use and revision of procedures, particularly those procedures required to implement the TSR, is required to be in the administrative control section of the TSR by DOE Order 5480.22, Section 9.e.(5). Does this description include how changes in the TSR are included in the procedures? Are specific procedure types identified that are managed under this control? Do these types encompass all the TSR commitments that would require a procedure? Are other documents referenced that detail how these commitments are met? Are the discussions consistent with corresponding discussions in the SAR?			
19. Is the USQ program as required by DOE O 5480.21 committed to? Is the program summarized and is the detailed procedure or process for implementing the USQ process referenced? The commitment for the USQ program to be compliant with DOE O 5480.21 or with applicable UC/DOE contract requirements, as appropriate, must be included.			
20. Is the contractor organization and management structure addressed? This is a requirement of DOE O 5480.22, Section 9.e.(5). Does the description focus on the line authority, responsibility, and communications for the facility ranging from the operator on the floor to the person ultimately responsible for the facility and its operations? Are lines of authority, responsibility, and communication for critical support functions, if any, identified. These should include fire protection, maintenance, emergency response, security, etc. If independent review groups oversee or audit facility operations, identify them and their organization and reporting chain. Reference LANL program documents as necessary.			
21. Is the safety review and audit process addressed? This is a requirement of DOE O 5480.22, Section 9.e.(5). Does the discussion address the review of all safety items? Are those items requiring review identified? Do these items include proposed changes to TSRs and procedures, operational			

Question	Yes	No	Comment
occurrences and Occurrence Reports, USQs, and quality control concerns? Identify any LANL organizations or committees that provide or support safety review. Identify any off-site groups that may provide safety review support. Identify external review group charters, LIR requirements, agreements, or other information that defines the role, scope, and methods used by these groups to provide safety review or support the audit process.			
22. Is there a commitment to and a description or reference to the facility document control system? Dose this control system support facility operation to the most current of important documents such as the TSR, SAR, operating procedures, facility drawings, manual, program descriptions, and other similar documents? (Ref Attach 1 DOE O 5480.22, II,2.4.d)			
23. Are reporting requirements for TSR deviations included in the administrative controls? This is required by DOE O 5480.22, 9.e.(5). A commitment to report deviations in accordance with the LANL occurrence reporting system and associated UC/DOE contract requirements should be included.			
24. Is there a description of the process for revising the TSRs? Does this description include required facility and LANL reviews and approvals? This disruption may be included in another section of the administrative controls dealing with facility and LANL organization and management.			
25. Is recordkeeping addressed? This is required by DOE Order 5480.22, 9.e.(5). This section should describe the recordkeeping program, or if no formal program, then define how the function is accomplished. Does the discussion include the types of records that are kept, storage requirements, retention times, and retrieveability requirements?			
26. Unless the TSR consists of only Administrative Controls, is the OPERABILITY definition and implementing principles described? Do the implementing principles include at least the six principles listed in DOE Order 5480.22, Att. 1, Sec. II.2.4.h? This topic may be included in the Use and Application section instead of the Administrative Controls.			

Question	Yes	No	Comment
27. Is the program to control the TSR basis described and committed to? Does this section describe how the program works, the management functions making decisions on basis changes, and the review process? This may be addressed elsewhere in the TSR such as document control. This topic is recommended by DOE O 5480.22, Attach 1, II.2.4.i.			

SAR/TSR Review Checklist
Los Alamos National Laboratory

Facility: Reviewer(s):
Document Draft/Rev/Date:
Date:

TSRs – Appendix A, Bases

Question	Yes	No	Comments
1. Are all technical bases presented in a clear, logical and concise manner that follows the format of the Attachment to DOE 5480.22?			
2. Are all technical bases presented in a clear, logical and concise manner that facilitates the evaluation of unreviewed safety questions that may arise from investigating changes to operating parameters of safety controls or potential changes to the margin of safety?			
3. For each TSR specified (e.g., SL, LCO, LCS), are the technical bases directly based upon specific sections (including references) the hazard or accident analyses contained within Ch. 3 of the SAR/BIO?			
4. For each TSR specified (e.g., SL, LCO, LCS) that impacts the operation of a safety SSC, are the technical bases directly based upon safety function and system evaluations (including references) contained within Ch. 4 of the SAR/BIO?			
5. For each TSR specified (e.g., SL, LCO, LCS), do the technical bases take into account assumptions or uncertainties that have potential impact to the hazard/accident analyses?			
6. For each TSR specified (e.g., SL, LCO, LCS), are the technical bases for not considering specific operating modes provided?			
7. For each action statement contained within a LCO, do the technical bases allow for the conclusion that the margin of safety has not been compromised?			
8. For each action statement contained within a LCO, do the technical bases allow for the conclusion that the completion time for an action is acceptable?			

Question	Yes	No	Comments
9. For each action statement contained within a LCO where actions partially compensate for loss of a safety function, do the technical bases allow for the conclusion that the margin of safety has not been compromised?			

SAR/TSR Review Checklist
Los Alamos National Laboratory

Facility: Reviewer(s):
Document Draft/Rev/Date:
Date:

TSRs – Appendix B, Design Features

Question	Yes	No	Comments
1. Is the information presented in a clear, logical and concise manner that follows the format of the Attachment to DOE 5480.22?			
2. Is a detailed description of each vital passive component, including functions, dimensions, design criteria, applicable codes and standards, materials used, in-service inspection required, manufacturer, and all details that must be considered prior to alteration, modification, or replacement discussed in a clear and concise manner?			
3. Is the configuration and physical arrangement, for cases where it is a safety concern, discussed? Are details pertaining to the design provided (e.g., configuration or physical arrangement including dimensions) and the reasoning behind the design?			
4. For cases where the safe operation of the facility is dependent on any component being constructed of a particular material, is the component and system identified, as well as the special material involved, any in-service inspections required of the material or component, and any special operational considerations such as maximum/minimum temperature, pressure, flow, or chemical concentration?			
5. Are site characteristics such as the locations of public access roads, collocated facilities, facility area boundaries, site boundaries, nearest residence distances, etc., presented?			

Additional Instructions for Hazard Analysis and Accident Analysis Checklists

DOE-STD-1104-96 identifies four general conclusions that should be met for approval of Ch. 3 of a SAR. These four conditions are listed below:

- The hazard analysis includes hazard identification that specifies or estimates the hazards relevant for SAR consideration in terms of type, quantity and form, and also includes properly performed facility hazard classification.

- The hazard analysis includes hazard evaluation that covers the activities for which approval is sought, is consistent in approach with established industrial methodologies, identifies preventive and mitigative features for the spectrum of accidents examined, and identifies dominant accident scenarios through ranking.

- The hazard analysis results are clearly characterized in terms of defense in depth, worker safety, and environmental protection. The logic behind assessing the results in terms of safety-significant SSCs and designation of TSRs is understandable and internally consistent.

- Subsequent accident analysis clearly substantiates the findings and delineations of hazard analysis for the subset of events examined and confirms their potential consequences. Events potentially exceeding evaluation guidelines need to clearly identify associated safety-class SSCs and basis of TSR derivations.

Review criteria to support these conclusions are provided in four checklists covering (1) hazard identification, (2) hazard evaluation, (3) hazard analysis results, and (4) accident analysis.

Hazard Identification Checklist

(1) The summary table of facility hazards must identify each hazard (e.g., plutonium 239, chlorine gas, thermal energy), its form (e.g., powder, liquid, solid), the type of hazard (e.g., radiological, toxicological, explosive), location, and quantity. With DOE's concurrence, however, a BIO may focus on the major hazards as opposed to the complete, systematic listing expected in a SAR. For large nuclear facilities with many hazardous materials in small quantities (e.g., facilities with numerous gloveboxes and storage vaults), it may also be impractical to identify every possible material location by individual stations. In such cases, locations and quantities of materials should be specified by room and operation, generically for low quantity operations and specifically for major operations. Lists should provide enough detail that DOE reviewers knowledgeable about facility operations can understand the approximate material quantities foreseen in each major operation, can estimate the distribution of the materials within the building, and can concur with the material-at-risk quantities or energy estimations used in the accident analysis.

(2, 3) The hazard identification should cover all the activities discussed in facility description, and no material should be listed in the hazard identification without some discussion of its associated activity in Ch. 2. In the same sense, the hazard and accident analyses and their associated text make assumptions about material quantities that should correlate with the hazard identification.

(4) Logic must be employed to specify quantities of hazardous material for energy sources. For example, assessments looking at specific operations will typically use flowsheet parameters or administrative limits to assign quantities. In some cases, nuclear criticality limits are used, although these may be excessively conservative depending on how the limits calculated correlate to actual operating practice. It would be inappropriate, however, to randomly mix-and-match flowsheet and criticality limit parameters. In all cases, there must be an identifiable reason why a given quantity was assumed. The net result should be a reasonably conservative estimate, keeping in mind that DOE-STD-3009 states that accident analyses should assume facilities are operating in a realistic state, not in a worst-case state of procedure violation or unknown material accumulation.

(5) DOE-STD-1027 was established to remove hazard classification as an issue of significant contention. A simple statement of exceeding the Category 3 or Category 2 thresholds is all that is typically necessary, especially for Hazard Category 2 facilities, most of which involve quantities of material making their classification obvious.

The standard also allows a facility to perform a final hazard categorization in order to make the case that its bounding accident potential does not exceed the bases of a given STD-1027 threshold. Where such cases are made, it is important to remember that the bounding potential must consider all the material in the facility. The location with the most material may not be susceptible to the worst airborne release fraction, and vice-versa. STD-1027 deals with this problem by assuming all the material in a facility was vulnerable and using facility average release fractions (i.e., neither the highest or lowest possible). For facilities with many curies and/or many different locations of material, attempts to identify a bounding accident potential that lowers hazard categorization should not stem from incomplete assessments open to challenge.

Hazard Evaluation Checklist

(1) The methodology section should clearly identify a generally accepted hazard analysis method (e.g., Preliminary Hazard Analysis (PHA), Hazard and Operability (HAZOP) Study, Failure Modes and Effects Analysis (FMEA), "What If"/Checklist) or combination of methodologies used. Hazard analysis methods differ in their appropriateness for use depending on the types and complexity of operations being examined. Checklists, PHAs or What If approaches are generally used on simpler or well-understood systems and operations. Where operations are routine and familiar, hazard analysis teams members can identify issues of concern from their own first-hand experience and knowledge. When a specific subject assumes sufficient complexity that a number of distinct sub-component failures need to be characterized, FMEAs and HAZOPs may be necessary. Selection of an appropriate method or methods for a hazard analysis, however, is a subjective decision. Other factors should also be considered, such as the previous experience of the team leader or the team itself. Judgements of appropriateness are often less a question of actual technique than of the attitude and effort put into use of a given technique.

(2) A hazard analysis should be performed by a team that includes members with first-hand experience of the actual facility's operation and design. The hazard analysis should not be performed entirely by outside personnel. If facility operators and engineers are not involved in the team, there is no basis for assuming the evaluation to be accurate.

(3, 4) A reasonable effort should be made to use accurate information available. It is recognized that most existing facilities will not have a complete collection of ideal documentation, but there is a minimum standard of information essential for an adequate hazard analysis. While a complete set of "as-built" information, or even P&IDs for every system is not required, a flowchart and process layout is generally necessary, as well as a basic understanding of materials of construction, piping connections, power supplies, etc.

(5, 6, 7) These criteria simply establish basic groundwork. If this material is not made available to the reviewer, there is a fundamental problem with either the product, the process, or both. The hazard evaluation worksheets must cover all operations and activities discussed in Ch. 2, *Facility Description*, as well as all hazards identified previously in Ch. 3. For each entry, the minimum set of information required is:

- The specific hazard(s) assessed (e.g., the radiological hazard of plutonium or the toxicological hazard of chlorine gas)
- The accident type (e.g., fire, explosion, or toxic spill) and cause
- Relevant preventive and mitigative controls for each scenario (e.g., hydrogen detector, interlocks, fire suppression system, alarms, specific operator actions)
- The consequence and likelihood binning parameters for each scenario; and
- As needed, recommended actions or items to examine further.

The most common error in hazard analysis is for the identification of preventive and mitigative features to be generic, with most just a partial listing of administrative features. That does not support integrated safety management, the principal purpose of requiring a hazard analysis. For that same reason, it is also critical to see evidence that recommended action items have been made for both minor and major issues, and that some follow-up

is occurring on these items. Detailed documentation to that effect need not be in the hazard analysis, but should be traceable to it.

(8, 9) The methodology is required to have a defined binning technique. The technique is defined for the analysis as the organization finds appropriate, and there is no one binning technique that is inherently better than another. The binning technique must include some measure of accident scenario frequency and impact/severity. In addition, it should define a prioritization level based on the both the frequency and impact/severity measures.

Binning criteria should be selected so that a small number of accident scenarios clearly emerge for further examination in accident analysis. That is, the general perspective provided by the binning process should make it obvious why the small subset of accidents examined in accident analysis was chosen. The binning system complicates and distorts the review process if it mixes medium and high consequence events, smears together different measures of consequence (i.e., public and worker, mitigated and unmitigated), or uses frequency as a means to dismiss internally initiated scenarios of high consequence. The latter fault immediately calls the whole accident analysis activity into question, while the other two require detailed reconstruction by reviewers familiar with the operations conducted in order to determine if the accident analysis has focused on an incomplete or incorrect set of bounding accidents. It should be kept in mind that the purpose of binning in DOE-STD-3009 is to provide a general risk perspective, not to prove some level of risk acceptance.

(10) No checklist can be used to prove completeness for the variety of operations evaluated in non-reactor nuclear facility SARs, and no hazard analysis team can guarantee that they have identified all possible hazardous scenarios. Evaluation of comprehensiveness requires practical knowledge of the operations assessed and informed judgement. The reviewer must, however, believe that a conscientious effort has been made to comprehensively evaluate hazards.

Hazard Analysis Results Checklist

(1, 2) These criteria do not relate solely to the SAR write-up itself. Appropriate integrated safety management will assess recommendations from the hazard analysis for closure, either by recognizing and justifying that the issue is not a problem, or by implementing administrative and design corrections. DOE desires to see a questioning process in place that leads to routine fixing of problems rather than an analysis whose purpose is to demonstrate there are no problems. Therefore, review must assess the hazard analysis process and its results to determine if meaningful feedback to operations has occurred for issues large and small.

Where commitments are made for major safety improvements, or significant concerns are currently unresolvable, reviewers should verify that interim safety or operational controls are in place. These interim controls allow facilities and operations to establish a safety basis while options for improvements are studied or engineering backfits are considered. That allowance should not, however, become a vehicle to acknowledge deficiencies without any corresponding safety management commitments.

(3) The defense in depth definition based on the hazard analysis results is the fundamental focus of review. Defense in depth is a receptorless concept. It focuses on those aspects of design and operation that prevent major uncontrolled hazardous material releases independent of specific receptors. DOE SARs do not have the predefined understandings of functionality and what is significant that characterizes reactor SARs, and so the hazard analysis must be distilled into a basic definition of defense in depth as it practiced for an existing facility or planned for a new facility. This definition should include administrative features and programs as well as systems, structures, and components. Characteristics of an effective defense in depth discussion include: systematic organization of the presentation, typically by identifying layers of protection starting with the hazardous material and working outward; identification of important features in general terms as opposed to detailed design information; tying features to overall control principles, such as ventilation pressure differential zones of confinement; and an overall assessment of why the defense in depth for both specific hazards and overall operation are at least commensurate with general industry practice. It is important to remember that there is no generic number of layers required, and that such generic specificity cannot be expected for the wide variety of operations conducted in the DOE complex. The purpose of this section is to clearly define defense in depth so that the DOE and the facility operator have the requisite information needed to intelligently discuss the parameters of an appropriate authorization basis. A good rule of thumb for judgement is that a reviewer not familiar with the operation at a detail level should feel, after

reading the facility description and defense in depth sections alone, that he/she understands the principal facility hazards and controls without progressing to any detailed examination of hazard or accident analyses.

The hazard analysis must also be distilled into a basic definition of worker safety as it practiced for an existing facility or planned for a new facility. Characteristics of an effective worker safety discussion include: systematic organization of the presentation, typically by identifying general features of protection and progressing to any unique issues of high consequence; basic prioritization of concerns; tying features to overall control principles, such as ALARA; and an overall assessment that explains how worker safety for both specific hazards and overall operation are at least commensurate with relevant industrial practices. The worker safety section is subordinate to the defense in depth section, as the latter provides overall facility definition from a receptorless perspective. If redundant information could belong in both sections, STD-3009 prefers it be placed in the defense in depth section and referenced in the worker safety section. For example, gloveboxes with associated ventilation and zone pressure differentials play an obvious and vital role in preventing worker exposures because they are fundamental in preventing uncontrolled material releases. For the purpose of defining facility safety, the latter function is broader and should already have been detailed in the defense in depth write-up.

(4) The hazard evaluation assessment sections of Ch. 3 must obviously be supported by the hazard evaluation itself. Otherwise, the process upon which DOE is depending for its conclusion that facility operations are understood and controlled to the best of experienced ability has not been demonstrated.

(5) Beyond simply defining defense in depth and worker safety, the SAR must also identify what components are most significant, and therefore to be controlled under the increased oversight associated with safety significant SSC and TSR definition. It is important that the bases for designation are clearly explained, as this section in essence documents an agreement between DOE and the facility operator.

STD-3009 provides general guidance for defense in depth safety SSC selection: "To effectively use the graded-approach concept, focus on the most important aspects of defense in depth whose failure could result in the most adverse uncontrolled release of hazardous material." The standard further specifies three types of controls that are typically most significant: the outer or predominant means of mitigating uncontrolled releases of hazardous materials (e.g., ventilation system directing airflow to HEPA filtration); preventive features that preclude highly energetic events that essentially destroy any one layer of protection or threaten multiple layers (e.g., large explosions); and SSCs needed to insure the availability of the first two features." For worker safety, STD-3009 establishes a threshold of immediately life-threatening or potentially disabling, with the intent being that the threshold be subjective on a case-by-case basis. The restriction to immediately life-threatening potential removes latent health issues such as the carcinogenic potential associated with radiological exposure. That worker safety issue is not dismissed, but rather is handled through a radiation protection program whose focus and principle features are well-defined and subject to general agreement throughout the operational community.

The intent is for safety SSC designations to make sense. While SAR preparers may use any analytical algorithms they find helpful in selecting SSCs, the DOE is not required to accept such efforts as binding for its SAR review. For example, consider a SAR for an operation with many gloveboxes holding kilogram quantities of material that designates only that portion of the ventilation system serving the one operation examined as a surrogate bounding accident in accident analysis. Such a result is obviously the artifice of an analysis confusing surrogate representations with the real safety issues of the operation. A DOE reviewer can and should reject such a narrow designation in light of the requirement that results make sense. At the same time, it is also important that the reviewer not adopt a mindset designating anything with a safety function as safety significant. Safety SSC designation is intended for the most significant controls and it is not DOE's position that lack of safety SSC designation presumes the control has no reliability. Such an approach would be a violation of the precepts of integrated safety management, where any number of administrative programs are required to oversee all aspects of operation.

(6) If the SAR is to be found acceptable, reviewers must concur with a final version of this Ch. 3 section. Whatever iterations or additions may be made in review, DOE must ultimately conclude that the formal controls specified in the TSRs are adequate.

(7, 8) The review conclusion of interest is that facility management is not ignoring obvious design or operational practices associated with minimizing environmental insult. It is expected that a properly developed defense in depth section will have already defined controls that prevent unmitigated releases, so that documentation in this section is often a formality. This section should clarify that there are no large release potentials that could cause significant environmental damage for which normal industrial levels of protection are not already in place, or for which easily implemented design or operational changes could minimize the chances of that release occurring.

DOE-3009 states that safety significant and TSR designation should not be made for purely environmental issues, as these are not direct safety issues. In the event that unique environmental release potential exists with potentially major consequences, these should be addressed on a case-by-case basis in the defense in depth write-up.

(9) The accident selection section should provide a clear bridge between the hazard analysis and the accident analysis. The latter is a follow-on activity whose defensibility, in terms of examining a small number of bounding accidents, derives from the comprehensive nature of the hazard analysis. If the work to this point has been documented correctly, it should not be difficult for the SAR preparer to identify and explain unique and representative bounding accident selection in terms of the parameters used to calculate source terms and doses.

The ranking bins used should present information so that major accident potentials are obviously discernable, with the associated write-up making the completeness of the subset obvious. If the rankings are unclear, or the SAR relies on complex sequences of decision trees to derive accident selection, the defensibility of the accident selection rests solely on the degree to which their expertise allows reviewers to reconstruct a link between the hazard and accident analyses.

(10, 11) As a major purpose of accident analysis is to identify a need for safety-class SSC designation, the selection process should not be skewed so as to miss accidents with the potential to exceed Evaluation Guidelines. Two major errors are generally responsible for improper accident selection: (1) risk selection that has co-mingled worker consequence with public consequences; and (2) using overall scenario frequency arguments to dismiss physically possible high-consequence internally initiated accidents that are unlikely precisely because they are prevented and mitigated by operational controls.

DOE has defined, based on hazard categorization, natural phenomena stresses that facilities should be assessed against. The typical natural phenomena of concern related to these criteria are seismic and wind, though site-specific phenomena can sometimes be a concern. DOE Order 420.1, *Facility Safety*, implements DOE Standards 1020, 1021, 1022, 1023, and 1024, which detail the probabilistic assessment criteria and its development. The reviewer should verify that appropriate stress levels are assumed in a SAR/BIO. External events (i.e., plane crashes) are assessed if their overall frequency is approximately 1E-6/yr (see DOE-STD-3014 for aircraft crash frequency calculations). The details of these events and any probabilistic calculations may be presented in the accident analysis as opposed to the hazard analysis, but the accident selection section should specify all accidents sent forward to accident analysis. For other than internally initiated events, however, this may simply be a notation of g-level and windspeed, along with a statement of any external events dismissed due to low probability.

(12) The reviewer should verify that selection of representative types of accidents does not exclude unique controls from consideration. For example, consider a facility with five explosion potentials in similar processes, where the same fundamental controls prevent site boundary consequences on the order of 1 rem, 5 rem, 10 rem, 30 rem, and 40 rem respectively. Suppose this same facility also has one unique type of process that could have an explosion with estimated consequences of 25 rem. If the 40 rem accident is examined as a representative accident, it will allow assessment and designation of safety class SSCs for controls associated with 30 rem operation as well. If however, the 25 rem operation is not examined as a unique accident because it is bounded by the 40 rem accident, controls potentially requiring some safety class SSC designation will be ignored.

Accident Analysis Checklist

(1, 2, 3) In terms of analytical methodology, the reviewer must be able to appreciate the bases for all key analytical assumptions in the consequence calculation. Unlike the hazard analysis, the accident analysis performs an explicit consequence documentation function. Accordingly, vague or incomplete identification of parameters defeats the purpose of analysis. The SAR reviewer should be able to independently calculate an accident source term from the

information given. The reviewer is not required to document such efforts; his or her ability to do so is a direct reflection of the acceptability of the SAR documentation.

The reviewer must be able to identify the dose exposure location distance and the meteorological conditions assumed, so that results obtained can be checked against standard modeling estimates. Likewise, the use of phenomenological codes requires specifying both the code and the modeling inputs specifically enough that the appropriateness of that use can be assessed. Extensive details may be referenced to appendices or separate documents, provided these are available for review.

(4, 5) The criteria for scenario development are driven by the documentation function of accident analysis. Clarity is needed for the same reason it was in the defense in depth write-up in hazard analysis, namely that safety functions might be defined based on this information.

Many of the accidents analyzed for nonreactor nuclear facilities possess a generic quality. For example, fires are often postulated with no ability to define their progression in meaningful detail. This makes event trees relatively uninformative, allowing a number of questions and misunderstandings to arise as regards the specifics of progression in an actual facility or operation. A solid, written description minimizes such misunderstandings. It also clarifies the controls relevant to preventing and mitigating the accident in a facility specific context. This is important, since many SAR efforts have stumbled in making generic assumptions about SSCs such as fire suppression systems, whose capabilities and vulnerabilities vary between facilities.

(6, 7) In cases such as seismic events, a team of specialists will evaluate the base reference material to reach final concurrence on the definition of damage caused by the phenomena. The Chapter 3 reviewer's initial job then becomes verifying that the accident description satisfies the concurrence reached, with the assistance of those specialists as needed, and determining that the accident description makes sense at a technical laymen's level.

The scenario development cannot presume conditions at odds with other portions of the SAR, most specifically the facility description, the hazard analysis, the definition of safety SSC requirements in Chapter 4, and any referenced studies. For example, the accidents presented in accident analysis should correlate directly to the selected outputs from hazard analysis. The accident sequences and their results presented should also be consistent with the assessments and definitions for defense in depth and worker safety developed in hazard analysis. If that is not case, which it has not been for multiple SAR submittals throughout the DOE complex, Chapter 3 is fundamentally flawed and requires significant revision.

(8) Having verified minimum requirements for consistency and documentation, the reviewer must now assess the actual calculations. This is typically a two-step process beginning with an assessment of the basis for a given number and concluding with an evaluation of its appropriateness in the overall scenario context. For phenomenology, the initial step might be to verify that a TNT equivalent or a heat of combustion conforms with standard references; for source term, one might examine material-at-risk against the hazard identification listing or a release fraction against references such as DOE-HDBK-3010-94. The second step requires determining whether the overall combination of numbers, and their underlying assumptions, is appropriate. For example, suppose a fire analysis assumed all the doors to a room were open to the atmosphere. If, in fact, the real room only opens to hallways, this can be a nonconservative assumption for the overall scenario in terms of heat lost. The reviewer should also consider whether assumptions made are too conservative, unless the stated purpose in the SAR is to demonstrate minimal problem under the most extreme conditions.

(9) The reviewer must conclude that the source term and dose estimates are a reasonably conservative approximation. That is not intended to mean that every parameter in the calculation is the worst value imaginable under any circumstance. SARs have been approved where review documentation acknowledges that some parameters in the five factor equation could be larger, the critical determination being the reviewers conclusion that the net result obtained was still conservative in terms of what would realistically be expected. Such a determination is inherently subjective due to the large uncertainties in accident modeling.

(10) SARs are sometimes written in a manner that obscures the unmitigated source term potential. The maximum airborne respirable source term for alpha-emitting radionuclides should always be clearly identified in the SAR write-up. It is the product of the material-at-risk, the damage ratio, the airborne release fraction, and the respirable

fraction, without accounting for subsequent stages of filtration beyond the immediate point of source term generation.

For non-alpha emitters that may produce direct shine doses, a source term not accounting for respirable fractions should be specified. For hazardous materials, the release rate producing a given downwind concentration is the result typically reported.

(11) SARs are also sometimes written without specifying the maximum unmitigated consequence. That is the dose obtained from the maximum source term without intervening filtration. This value should be clearly specified and explicitly compared to the Evaluation Guideline.

(12) If the unmitigated consequences of an accident exceed the Evaluation Guideline, a need for safety class designation has been identified. All the preventive and mitigative controls associated with the accident progression form the candidate pool for safety class designation, and any additional TSR commitments deemed necessary.

A subset of those controls should be selected, with a basis that makes common sense. The approval of that basis represents an agreement between DOE and the facility operator as to a specific focus of regulatory oversight. The same basic considerations noted for selecting safety significant apply here as well. In all but the most unique of operations, It is also presumed that assuming functionality of those controls designated safety class will result in an accident sequence with doses well below the Evaluation Guideline.

(13) If the SAR is to be found acceptable, reviewers must concur with a final version of this Chapter 3 section. Whatever iterations or additions may be made in review, DOE must ultimately conclude that the formal controls specified in the TSRs are adequate.